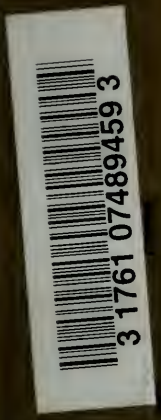
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MAN AND HIS MARKETS

LIONEL W. LYDE

PRESENTED

TO

THE UNIVERSITY OF TORONTO

BY

Messrs Copp Clark Co

April 30th 1897.

Examination copies of the accompanying Book have just reached us from the Publishers. We have pleasure in sending one to your address.

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MAN AND HIS MARKETS.

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Man and his Markets

A Course in Geography

BY

LIONEL W. LYDE, M.A.

EXAMINER IN GEOGRAPHY TO THE COLLEGE OF PRECEPTORS AND TO THE OXFORD LOCAL EXAMINATION BOARD; HEADMASTER OF THE ENGLISH DEPARTMENT IN GLASGOW ACADEMY; AUTHOR OF "MAN ON THE EARTH," ETC.

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PREFACE.

THIS book is intended to supply a course of study in Geography, and is a companion volume to *Man on the Earth*. My experience as an examiner for the Oxford Local Examination Board, and for the College of Preceptors, has confirmed that gained in teaching Geography to boys and in lecturing on it to working-men—namely, that it is impossible to teach the Geography of any particular area, with really satisfactory results, to any class which has not a substratum of geographical knowledge in two special lines.

The first of these is concerned with the great phenomena of the science, which I have already endeavoured to treat in *Man on the Earth*; the second is concerned with the chief necessaries of human life, which form the main subject of the present volume.

The two books are written from exactly the same point of view, and on exactly the same lines; but they have this difference of subject-matter, as their titles indicate: *Man on the Earth* deals rather more with the physiographical, and rather

less with the economic, element than *Man and his Markets*.

The much greater attention paid to Geography in recent years, especially in Germany and the United States, has attracted notice in this country; and parents are constantly and urgently demanding that their boys should have "a *good general* knowledge of Geography," such as will fit them for business. The time allotted to the subject in school is, however, still very small—in my own case, forty-five minutes a week with each class. Consequently, there must be from the outset a recognition of these limitations; and this involves an arbitrary selection of the matter to be taught, and every possible device for saving time.

In making this selection I have been guided by two considerations: that the matter *must* be at once valuable and interesting, and that it *must* be presented in such a way as to appeal primarily to the reason and the imagination.

The most valuable information is that which bears most closely on our daily life; and this was found to be also the most interesting to the boys, because they heard it discussed at home or saw it referred to in the daily papers.

With regard to the saving of time, I found that the greatest waste of it was caused by the necessity for beginning afresh with every new country, and for repeating over and over again great principles, *e.g.* the reasons for the growth of towns. In other words, the boys could not make full use of physical and geological maps because they had not the necessary knowledge of principles. Practical experiment proved, however, that a whole term "wasted" on the

great phenomena of the science and on the chief necessaries of life, was amply repaid when we came to deal with the earth piecemeal by continents and countries. And it is the result of this experiment with my own classes that is embodied in *Man on the Earth* and *Man and his Markets.*

This substratum of knowledge enabled us to understand the atlas, to argue constantly by cause and effect, and to apply known conditions instantaneously to new cases. It also involved us in constant verification of facts, and in constant appeals to observation.

Of course, it is absolutely essential to do such work in close connection with the atlas; and, in view of this, care has been taken to mention very few places which will not be found even on the cheapest atlas; *e.g.* "The Satchel," or Keith-Johnston's "Sixpenny." A wall-map is certainly very useful, especially a really large *Mercator*; but I have come to the conclusion that the most satisfactory results are obtained when every member of every class has an atlas of his own. Then every place can be looked out by every one every time that it is mentioned; and, if this is done carefully and constantly, names and positions come to be remembered with great ease and accuracy.

The experience of ten years has convinced me that Geography thus treated not only gives boys a mass of general knowledge of considerable practical value, but also arouses in them a keen interest in their relations to the planet on which they live; and the mental training is thoroughly scientific.

I hope that the large number of pictorial illustrations will help to make the information more concrete, and that the full triple index will be of use in systema-

tizing facts which are necessarily distributed over various parts of the book.

I have to thank Messrs. Methven for their courtesy in allowing me to make use of some of the material in my *Commercial Geography of the British Empire*, published by them.

L. W. L.

June, 1896.

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MAN AND HIS MARKETS.

MAN AND HIS MARKETS.

ENVIRONMENT.

THE difference between **savage and civilized races** is practically the same as that between a child and a man, for savages unite the main characteristics of childhood with the strength and the passions of manhood. Like children, they imitate closely and constantly; and this tendency, as in the case of the Patagonians, is absolutely fatal to progress. Like children, they sacrifice ultimate good to immediate pleasure: the Australian Blacks will cut down a whole gum-tree to catch one opossum, as the Mashonas round Zimbabye will burn a whole acre of fine grass to catch one dish of mice. Like children, they have no power of concerted action: thus, Caesar took St. Albans, and Plautius took Colchester, from Britons by the help of Britons. Like children, they do not understand, and so have no command over, the powers of nature; the prairies of Manitoba and Minnesota, the coal-fields of Sydney and Calgary, the oil-wells of Pittsburg and Wheeling, the cataracts of Troy and Ottawa, were untouched by the Red Men.

This knowledge of, and control over, nature is obviously acquired more easily by a stationary than by

OTTAWA.

a wandering race, for it requires long and continuous study. Moreover, in proportion as a people is settled or nomadic, so their associations are strong or weak. For instance, probably no part of the world invites nomadic habits more than the huge **pampas** of the Plate basin do. Over these pampas wander immense herds of wild horses, the progeny of those imported by the Spaniards in the sixteenth century from the Andalusian plains.

A GUACHO STOCKADE ON THE PAMPAS.

The Guachos, who are descendants of the same Spaniards, spend their whole lives in catching, training, and exercising these horses; and this has involved them in such a purely nomadic life, that they seem now to be entirely destitute, not only of political sympathies, but even of patriotic instincts.

The question arises, then,—Under what conditions does a people become settled, and thus civilized? Most commonly, by having very **marked natural boundaries**, which check or entirely forbid nomadic habits; and this is best done by deserts, mountains, and seas. For instance, the Sahara and the Nubian desert isolated the Egyptians, as the Syrian desert isolated the Jews; the Alps shut in the Swiss, as the Grampians shut in the Gaels; the Tyrrhenian and Adriatic seas did for Italy what the Ionian and the Aegean did for Greece. In each case the isolation caused concentration of the people; and the concentration drew out the sentiment of nationality, and thus guaranteed national existence and independence. Eventually, too, the increase of population in the restricted area caused emigration.

Different conditions, however, develop different characteristics. Speaking generally, mountains encourage love of home and a military spirit, while seas encourage love of home and a commercial spirit; fertile plains encourage agriculture and love of peace, unfertile plains a nomadic spirit and love of freedom. Scotch soldiers, English sailors, Chinese husbandmen, and Bedouin horsemen are typical instances; but we may consider a few other instances with greater detail.

If, then, we examine the effect of a **mountainous country** on its inhabitants, we shall find that it affects them by its atmosphere, its bulk, its external barrenness, and its internal riches. For instance, the mineral wealth of the Pennine Range has drawn the cotton trade to Lancashire and the woollen trade to Yorkshire, as the barren mountains of Norway have driven the Norwegians into marine industries. So, the scanty pasture on the Cambrian heights made "Taffy a

thief," as the forest-clad mountains of Servia have made the Serbs swine-herds.

In this connection, however, more attention may be paid to the effect of **mountain air** and mountain bulk. Even for temporary use as sanatoria, *e.g.* at

ENGLISH SAILORS.

Palumpore in the Kangra valley, or at Utakamand among the Nilgiri Hills, mountains are, of course, very valuable in tropical and semi-tropical climates. But, when they are the permanent home of a people, their exhilarating air induces a spirit and a physical

energy which are a good equipment for life. Such spirit and energy may easily pass into a love of war and even ferocity, as they did amongst the Highlanders of the Grampians and the Mahrattas of the Western Ghats; and, in that case, the bulk and the formation of the mountains at once assume a special importance.

AMONG THE NILGIRI HILLS.

From this point of view, mountains play both **a defensive and an offensive part.** Not only do they form an excellent rampart, such as was imposed by the Cheviot Hills between the Scotch and the English, or by the Carparthians between Christian Europe and the heathen hordes of Asia; but also their numerous obstacles and their varied surface necessitate considerable subdivision of armies, and great care in the handling of different kinds of troops, and this involves and develops exceptional care and intelligence on the part of every individual soldier.

This **military aspect** of the question may be further illustrated from the Spanish peninsula, which is usually known as "*The* Peninsula,"—partly because of its importance and its position in the Mediterranean, and partly because, as "*The* Cape," it has entered so largely into English history.

Spain, then, is a very compact tableland, isolated by the Pyrenees and the Sierra Nevada to north and south, and by the Atlantic and the Mediterranean to west and east. Internally, again, it is a series of compact valleys, isolated from one another by strips of almost always dangerous coast and by chains of generally barren and inaccessible mountains. The hot, sleepy valleys, with their rich pastures, and the barren mountain tracts, with their caves and cataracts, have made it the land of the siesta and the smuggler, the bull-fight and the bandit.

A comparison between the basins of the Guadiana and the Ebro brings out further points of interest. **The Guadiana basin** is practically of no importance from the military point of view. The international frontier is guarded on the Spanish side by Badajoz and on the Portuguese side by Elvas; the coast-strip between Faro and Palos faces due south, and is thus exposed to almost equatorial heat; the soil between the sea and the plateau is very rich; and the plateau itself, between the Toledo and Morena mountains, is one of the dreariest and least inviting portions of the whole peninsula. It is not surprising then that it is to this basin that the Spaniards owe their reputation for pride, laziness, and ignorance—or, in other words, their Dons, their officials, and their muleteers.

The basin of the Ebro presents a very different picture. It is close to France; it has no barren

plateau or great watershed to protect it; its upper basin between Burgos and Santander is moist, cold, and rugged; Aragon is a waste of ruined towns, and uncultivated ravines; Catalonia is a "sea of mountains," with walled villages, and few resources in food or forage; the head of the basin can be turned by the road from Bayonne to Madrid, and the centre by the innocent treachery of the Segre river. It is evident that such a country demands, and ought to breed, as it has bred, a race of warriors.

The French watershed of the Pyrenees has played a very similar part in the history of France. Guarded by the two fortresses of Bayonne and Perpignan, with the insurmountable double range of the Pyrenees between them, and with the barren stretch of the Landes to the north-west protecting Bordeaux, its importance is focused in the south-east—at Toulouse. The district is famous for its Basque Light Infantry, its cavalry horses, and its long list of great generals. Henry IV., Marshall de Gassion, and Bernadotte were all born at Pau; while Lannes was born at Lectoure, and Brune and Soult on the Guienne side of the Garonne—the former near Tulle, and the latter near Albi.

The other southern watershed of France, *i.e.* the Mediterranean, illustrates forcibly the perfectly obvious fact, that a range of mountains which shuts in a country, presents its *concave* side to that country and its *convex* side to surrounding countries.

That watershed may be divided into **three areas.**

The first is the eastern basin, *i.e.* the valley of the Upper Rhone between Geneva and Lyons, which is narrow, rugged, and unfertile, and therefore scantily peopled. The second is the northern basin, *i.e.* the

valley of the Saone, which on the west is narrow and composed of the rich vineyards of Dijon and Beaune and other towns along the Cote d'Or slopes, and which on the east has a broad corn and wine area stretching across the Doubs up to the slopes of the Jura. The third is the southern basin, *i.e.* the valley of the Lower Rhone. This, again, is narrow on the west, consisting only of the dry, broken fringe of the Cevennes, but is broad on the east, and rears a warlike and intelligent people amongst the barren spurs of the Alps between Grenoble and Nice.

These spurs represent the *convex* side of the Alps, and their valleys are divergent, while the eastward valleys converge on the common centre of Turin. Therefore, invasion from west to east, *i.e.* from France to Italy, has always been much easier than invasion from east to west, *i.e.* from Italy to France.

From this we may turn, for contrast, to lowlands; and the transition may be illustrated by the history of the **Arabs in Spain.** It is the history of a purely nomadic people, whose nomadic impulses had been intensified by the fact that their lowland home was a desert; and, therefore, they could not be expected to be anything except shepherds and hunters. Their isolation amongst the Spanish mountains, however, speedily concentrated them; and concentration developed at once farming and manufacturing tendencies, the results of which are still obvious.

Thus, the remains of their irrigation works are dotted all over the fertile provinces of Murcia and Valencia; the basin of the Guadalquivir alone contains the ruins of 12,000 towns and villages where they worked the merino wool, the marble, and the metals, which once made the little town of Cordova a

huge central market, with a population of nearly 1,000,000; the physiognomy and customs of the Nevada mountaineer recall the success with which they resisted the Spaniards amongst the wild gorges and granite soil of Granada.

Perhaps, in that resistance we may trace the influence of the desert. **Lowlanders**, as a rule, are less warlike than highlanders; and under certain circumstances, *e.g.* extremes of tropical or polar climate, the effect of a low level is seen to produce a marked deterioration in both physique and morals. For instance, amongst the low, hot swamps of Brazil, and the low, cold marshes of Siberia, the native type common to both has degenerated out of all resemblance to the same type as found on the dry, temperate plains of Hungary or China. On the other hand, the three great monotheistic religions of the world are all of the desert—Sinai, Judea, Arabia—and all Semitic in origin. All, too, teach the great lesson of the desert—renunciation: "Thou shalt *not*."

No doubt, the fertility of the Danube and the Hoang-ho basins helps to account for the intelligence and the industry of the Magyar and the Mongol; and the Magyar is certainly both brave and active. But, as a rule, courage and energy are developed more obviously on unfertile plains, such as those of Arabia and Tibet. To this extent it may be true that no conquering race ever sprang from a country which had a soil rich enough to invite conquest.

Special circumstances may, however, develop special characteristics; and a lowland people—though scarcely one of purely agricultural habits and living in a genial climate—may become as warlike as any highland clan. This might be illustrated by the Sikhs of the

Punjab, or the Cossacks from the Don ; but, perhaps, the most interesting illustration may be drawn from the Vendeans.

The Vendée district really forms part of the plain of Poitou ; and the latter gives such easy access from the Loire to the Garonne that it has been the scene of innumerable battles, *e.g.* Vouglé, between the Franks and the Visigoths; Tours, between the Franks and the Saracens ; Poitiers, between the French and the English ; and Moncontour, between the Papists and the Protestants.

But the Vendée country is more adapted than the rest of the Poitou plain for **civil war.** It is composed of the terraces which lead up to the Gatine hills, and is a labyrinth of woods, heaths, streams, salt-marshes, and ditches,—all offering peculiar facilities for offence or defence to people who know the country well,—amongst which battles like those of Luçon and Fontenoy were lost and won.

As a rule, however, the victories of a plain are the victories of peace, and they are best seen in a circumscribed area, such as Belgium or Holland.

For instance, the greater part of **Belgium** is a dead level, which offers every facility for cultivation and communication ; and, as this level part of the country is contiguous to the sea, the collection and distribution of manufactured goods or raw material can be conducted with great speed and at small cost. No country is better supplied with roads, waterways, and railways ; and the fares by the latter are exceptionally low.

In the north-east of the country there is a continuation of the marsh lands of eastern Holland, but these, as in Holland, are being drained and cultivated.

The cultivation, as throughout the greater part of Belgium, is done mainly by spade—owing to the smallness of the holdings, which is due to the dense population of the country; and this, again, is due to the geographical position and the geological formation of the plain.

Spade cultivation, however, is too expensive for grain, for which also small farms are not suitable; and in such a densely-peopled country land is too valuable to be devoted entirely to food purposes, especially when the standard of comfort is so low that the food grain is rye.

SCENE IN THE LYS VALLEY.

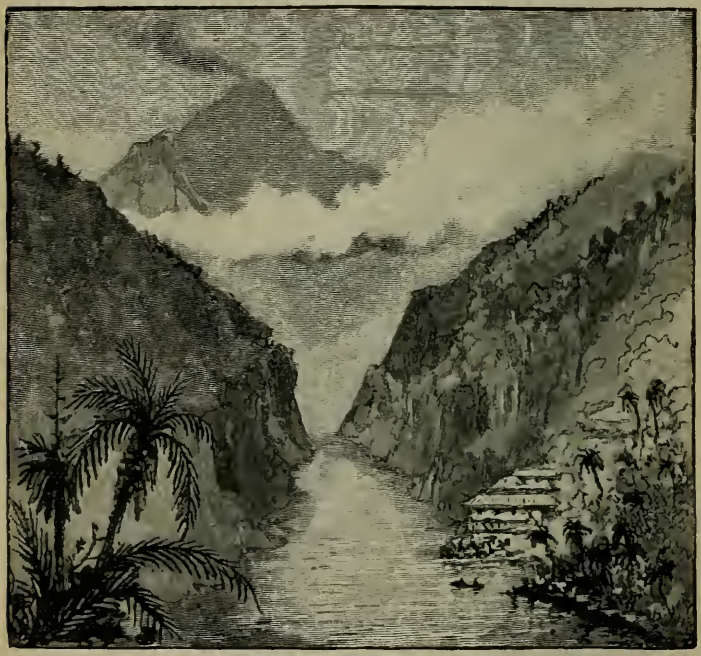
Moreover, owing to the low level of the land, which does not offer any effective condensing medium, the rainfall (28 inches a year) is not a fair index of the real moistness of the climate, especially near the sea,

i.e. in Flanders. It happens also that in the same district there is a remarkable absence in the soil of limesalts ; and this makes the water of the Lys river peculiarly well adapted to the cleansing of flax, just as the water of the Maine (U.S.A.) rivers is to the manufacture of pulp and paper, or that of the Loire at St. Etienne to the tempering of iron, or that of the Trent at Burton to the brewing of beer. Consequently, the wealth of the Flemish peasant consists chiefly in flax ; and, owing to the abundance of coal and iron in the neighbourhood between Tournai and Liège, Courtrai and other towns in the Lys valley have become as famous for fine linen as Brussels, Mechlin, and Bruges have for fine lace.

What has been said about the climate of Belgium is more or less true of **Holland**. The country is very low and very flat, and is exposed on the north, as well as on the west, to wet sea-winds. Consequently, the air is very damp, and the sky is continually clouded over ; but there is no effective condensing medium to precipitate the moisture in rain or snow.

In such a climate, and on an alluvial soil, the agricultural products are sure to include rye, potatoes, and flax ; and the demand for really good flax for the Belgian lace industry causes a single crop of it to be sometimes more valuable than the whole piece of land on which it was grown. But the most important product of all will be **grass**, for the low moist polders give splendid pasture for the production of milk ; and dairy industries suit a country like Holland, which has very important colonies, *e.g.* in Java, Sumatra, Borneo, and Guiana, to attract its male population to commerce. The cheese is made chiefly west of the Zuider Zee, *e.g.* at Alkmaar, and Hoorn,

and the butter chiefly east of it, *e.g.* at Leeuwarden and Zwolle ; but Delft makes both, and has special facilities for exporting them owing to its nearness to Rotterdam. It is characteristic of the soil and the climate that Haarlem, which stands on the coast between Alkmaar and Delft, should be famous throughout the world for its "Dutch bulbs."



IN JAVA.

As the Spanish towns supply a link between the nomad and the manufacturer, between the desert and the mountain valley, so the Dutch supply one between the farmer and the colonist, between the lowlands

and the sea. But the **influence of the sea** has been illustrated more strongly, perhaps, in the history of Greece and Italy than in that of any other country except Great Britain ; and, certainly, the advantages of these two peninsulas under the blue sky and beside the tideless waters of the Mediterranean have been much greater than those enjoyed by the dull delta of the Dutch.

NEAR HAARLEM.

Greece is specially interesting, as its extraordinary proportion of coast was as conducive to piracy as to legitimate trading. Moreover, the belt of mountains across its northern frontier so isolated its people from the rest of Europe that they were almost bound to expand into Asia—by the natural bridge of islands which gives to the Aegean sea its alternative title of "*The* Archipelago."

Italy has, of course, very similar surroundings—a wall of mountains in the north, and islands to

east and west and south; and it has better rivers and a more central position than Greece. But the fertility of its soil, the excellence of its surroundings, and the character of its people, have all been partially neutralized by two defects. In the first place, like Egypt or Chile, it is too long in comparison with its breadth to be easily governed from a single centre; and, in the second place, its triple division into continent, peninsula, and islands, added the separation of different interests and habits to the separation of distance. Thus, the early jealousies of Rome, Tarentum, and Syracuse, and the later jealousies of Venice, Genoa, and Florence, recall the similar jealousies of Thebes, Alexandria, and Cairo.

This triple territorial division of the country is, however, by no means an unmixed evil. It has, indeed, continually dragged the people under the sway of foreign monarchs or native tyrants; but it has compensated for this by a **wonderful diversity of products**—from the silks and velvets of Milan and Genoa to the straw-plait and the olive oil of Leghorn and Lucca, or the fruit and the sulphur of Palermo and Messina.

To the same cause, no doubt, is due the marked adaptability of the **Italians as colonists**, especially in Brazil and Argentina. For instance, in the province of Rio Grande do Sul, which may illustrate both Argentina and Brazil, Italian and German colonists are found side by side. The German colony round New Hamburg occupies low, fertile valleys; the Italian colony round Caxias is amongst poor, rugged hills. The Germans are near a splendid waterway, the only drawback to which seems to be that the masts of barges require to be taller than the river-

side trees in order that the sails may catch the breeze; the Italians are fully fifty miles from water-carriage. The Germans have a railway to Porto Alegre, while the Italians can be reached only by a mule-track. But everything is cleaner and better in the Italian district than in the German; and the Italians seem to make more out of their barren highlands than the Germans do out of their fertile lowlands. The same is found to be true of Italian colonists elsewhere; and, no doubt, it may be partly accounted for by the character and conditions of Italy—its triple formation and its peninsular isolation.

The isolation of an island is, however, the most complete; and it may be illustrated by **Great Britain**. Though our climate is not very propitious, and though our resources are practically limited to pasture and minerals, we stand unrivalled for a display of human activity in all its forms—moral, mental, and material. Our soil and our position naturally encourage mainly manufactures and commerce; and our insular isolation has thrown our people entirely on their own resources, and has forced us to develop a naval empire.

If we compare our own history with that of our former rival, **Portugal**, we see the advantage of complete isolation. Portugal has a soil of extreme fertility a purely temperate climate, a position at the meeting-place of east and west, a splendid river, and a natural wall of mountains and foaming torrents from Almeida to Elvas. But, with such advantages, the Portuguese ought to have made more use of the work of Vasco da Gama and Magellan; and, surely, if they had been more completely isolated, they would have developed more national character and spirit, and would have done more than discover India and fringe

Africa abroad, and become famous for fat oxen and port wine at home.

TROPICAL VEGETATION IN CEYLON.

Of course, in these temperate latitudes the difficulty of obtaining **necessary food** is always present as a

motive to energy and industry; but in tropical latitudes, such as those of Ceylon or the Sandwich Islands, natural supplies of food are usually so great, and artificial supplies can usually be obtained with so little labour, that this motive is often absent. Fortunately, in the case of Ceylon there is a strong motive—the soil is not very fertile.

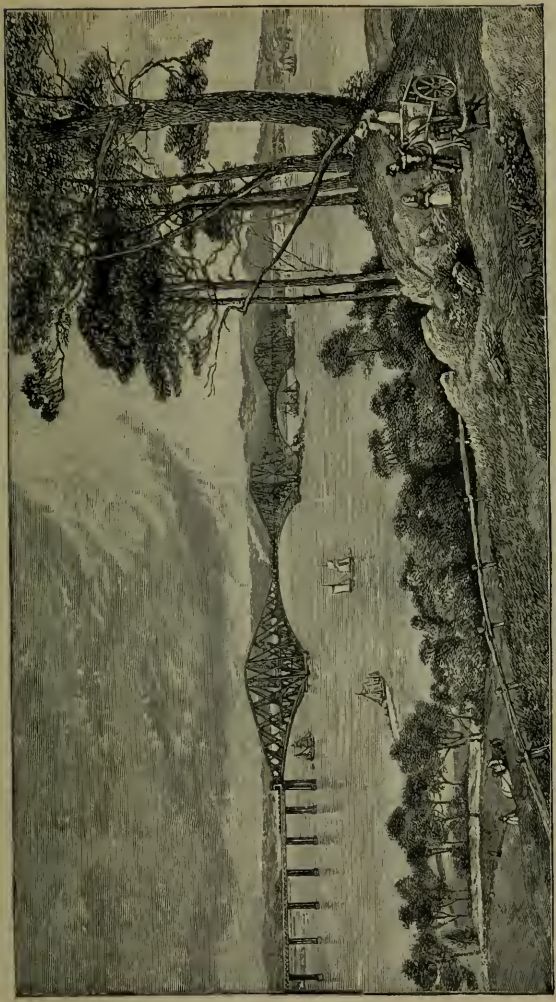
NEW GUINEA FISHING GEAR.

Otherwise, **Ceylon** has almost unique advantages It is very beautiful; it is interesting historically, socially, and scientifically, especially to the botanist and the naturalist: it is free from the cyclones

of the Moluccas, the hurricanes of Mauritius, the earthquakes and volcanic eruptions of New Guinea and Borneo; its capital, Colombo, is one of the most important harbours in the eastern seas; it possesses excellent roads and railways, and cheap means of transport to Europe; there is such a constant alternation of sunshine and rain that, "if you stick an iron crow-bar into a macadamized road in Colombo, it will blossom like Aaron's rod"; the forests are said to be fragrant with nutmeg and cinnamon; the Manar coast is rich in pearls, the river-gravel in rubies and sapphires; and labour is supplied by Tamil coolies from across Palk Strait. In a word, there is every thing except, fortunately, a very fertile soil; and, therefore, industry is absolutely necessary.

Amongst the islands of the whole world, however, whatever their latitude, **Great Britain** holds a unique position. It is in the centre of all the land on the surface of the earth; it is near enough to Europe to use it, and far enough from it to be free from its wars and pestilences; it is washed by the Gulf Stream in a latitude which corresponds to that of Labrador and Kamchatka; it enjoys a better proportion of coast to surface than any other country except Greece and Nova Scotia; and it has a series of harbours *vis-à-vis* between Dundee and Plymouth—the Clyde and the Forth, the Solway and the Tyne, the Mersey and the Humber, the Severn and the Thames. In a word, it has unrivalled advantages for commerce.

In some of these advantages, however, the whole of **Europe** shares to a greater or less degree. Europe is the smallest of all the six continents except Australia; but it is the most important of all, because it is the most densely peopled and the most civilized.



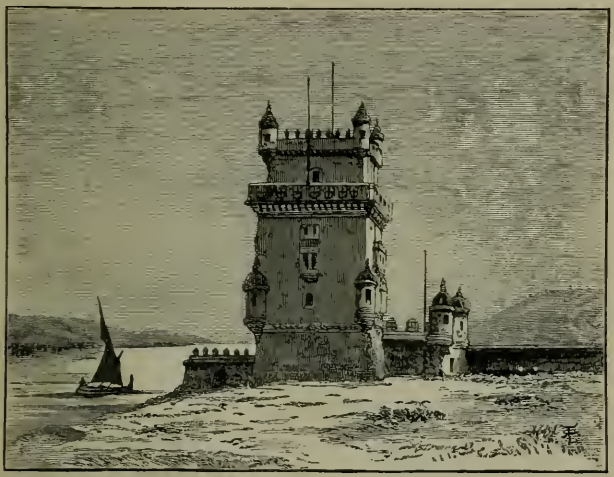
THE FORTH BRIDGE.

For this it is mainly indebted to the fact that it has the largest proportion of coast line. It is a collection of islands, peninsulas, and inland seas, which have, on the one hand, isolated and concentrated its various peoples, and, on the other hand, given every facility for commerce. No part of it is as much as 1000 miles from sea, and this affects its climate as beneficially as its commerce. Certainly, the heavy rain, the slight evaporation, and the numerous rivers, make seas like the White and the Baltic so fresh that they freeze very easily; but the Gulf Stream and the S.W. Anti-Trade winds more than compensate for this elsewhere.

The broken character of the coast, of course, reacts on the character of the land. For instance, it is impossible for there to be any really large rivers except in the east of the continent, where the expanse of surface is much larger than elsewhere, and where the 'relief' is very uniform. Though short, however, the rivers are very numerous; they radiate from common centres, *e.g.* the Alps and the Valdai hills; and the 'relief' allows the seas into which they drain, and the rivers themselves, to be inter-connected by canals and railways. For instance, both the Black Sea and the Caspian are thus connected with the Baltic, both the Black Sea and the Baltic with the North Sea, both the Caspian and the Atlantic with the Mediterranean.

The result is that the entire "**general trade**" of **Europe** is brought practically to the Atlantic and Mediterranean coasts, which are never ice-bound. Trade for the west goes to Hamburg, Amsterdam, Antwerp, Havre, St. Nazaire, Bordeaux, Lisbon, and Cadiz; trade for the east goes to Barcelona, Marseilles,

Genoa, Brindisi, and Trieste. As its name implies, this trade is not confined to any special products; but it may be said generally that raw materials are exports in the east and imports in the west, and *vice versa* with manufactured articles. There are, of course, exceptions to this, *e.g.* the timber and fish of Norway, and the ores and fruit of Spain.

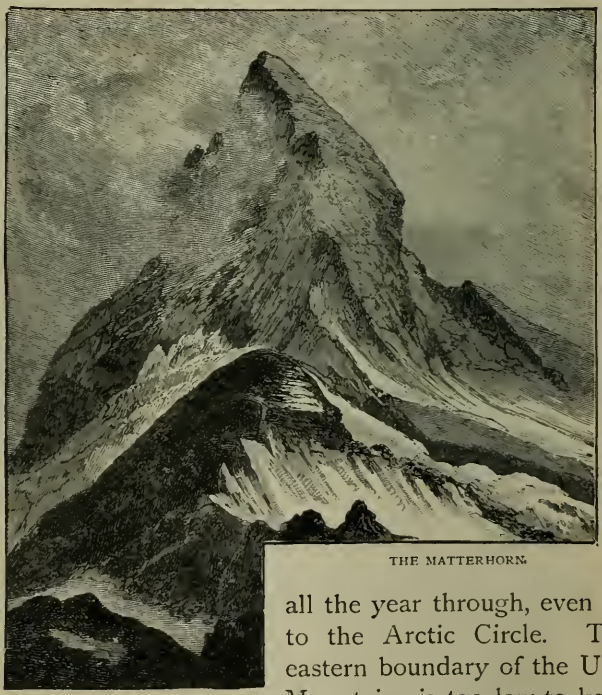


BETEM, LISBON.

Physical conditions, naturally, decide both the character of the products and the time and manner of their distribution; and it is useful to map out the whole continent into **natural trade areas**, on the principle of similarity of products and seasons.

The greater part of Europe lies in the North Temperate Zone; and, as has already been pointed out, the configuration of its coast brings the interior of the continent so near to the sea that its climate is

much more equable than it would otherwise be. The southern part enjoys a particularly favourable position, being in a comparatively low latitude, along the shore of the largest of all inland seas, and protected from the north and east by a belt of mountains. The north-west is greatly benefited by the presence of the Gulf Stream, which keeps the west coast open



THE MATTERHORN.

all the year through, even up to the Arctic Circle. The eastern boundary of the Ural Mountains is too low to keep off the hot and the cold winds from the gigantic plain of Asia; but no political danger threatens from that quarter, and the dryness of the winds is very useful to the agriculture of the Great European

Plain—the dry cold wind cleansing and pulverizing the soil in winter, and the dry hot wind helping to ripen the crops very perfectly in summer.

This great plain, which lies between the Scotch and Scandinavian mountains to the north, and the systems of the Pyrenees, Alps, Carpathians, and Caucasus, to the south, practically embraces half of the continent, and is at a very low level. Indeed, the mean elevation of the whole continent (1000 feet), is only half that of Africa, and considerably less than even that of America. This, of course, affects the climate beneficially—in a *temperate* zone.

The rainfall and the average temperature increase with nearness to the Atlantic; the soil is generally fertile—thanks mainly to the skill and industry of peasant proprietors in Belgium, France, and Germany, and to the natural richness of the "Black Earth" in Russia; the supply of minerals, especially coal and iron, is great and often near navigable rivers; and, where there is a want of coal, as in Italy and Switzerland, water-power exists. Moreover, the varied 'relief' of the west and the west-central parts—with their moderately warm and dry climate, in a latitude where the autumn is long—provides sheltered valley-slopes on which the vine flourishes; in the east and the east-central parts the absence of mountains makes agriculture easy, and gives free access to sun and wind; and in the north the rain-beaten heights of Scandinavia and the snow-covered lowlands of Russia are rich in timber.

"**The Baltic Trade**," then, includes all shipments to and from any ports on the Baltic Sea; and, as the export trade is largely in timber from the northern highlands and agricultural products from the northern

lowlands, it may be inferred that the population of the region is small, and, consequently, there will be no great demand for a return cargo of machinery or manufactured goods. The mountain terraces of Sweden, with their countless streams, produce little except timber and pasture, though the iron ore of Dannemora is in great demand; the plains of Russia and Germany produce, according to the character of the soil, grain, fibres, and roots; the German coal-fields attract raw materials, such as cotton and wool; and the absence of coal round the rest of the sea attracts fuel to places like Stockholm, Helsingfors, and Riga.

The difficulties of the traffic are considerable. Owing to the freshness of its waters, its latitude, and the amount of land round it, the sea freezes easily. It is also very shallow; and the excess of water supplied over that evaporated causes a strong current *out*, which makes the entrance—except by the Kiel Canal—difficult and dangerous to navigate. Moreover, the North Sea, into which this overflow escapes *via* the Kattegat and Skager Rak, is itself shallow, and has dangerous sandbanks; and, owing to the configuration of the land round it, it is subject to frequent storms. In this it resembles the Black Sea, which, however, is deep and free from islands; but its very depth keeps its waters so cold that, like the Great Lakes of Canada, it is subject to dense fogs and sudden storms.

The difference in latitude and in the 'relief' of the neighbouring region makes the **"Black Sea Trade"** very different from that of the Baltic. The huge plains of "Black Earth" in Russia usually supply Odessa and Kherson with enormous quantities of wheat for export, though the miserable agriculture

and the absurd economic conditions make the yield far less than it ought to be ; the warmer and damper Bessarabian plain and Danube valley send their maize ; the oil-wells of the Caucasus attract petroleum merchants to Poti and Batum. The imports, especially to the Danube, are largely British machinery and manufactures ; and this makes the friendship of Turkey, with its command of the Dardanelles and the Bosporus, of great importance to Britain.

In a word, the commerce of Europe is a sea-borne commerce ; and this is the most essential characteristic of the continent. Asia has stupendous mountains, Africa has leagues upon leagues of desert, and America has enormous river-plains ; Europe has its **inland seas**, which were its nursery for ocean traffic and for world-wide colonization, as soon as the restricted area became too small for the increasing population.

The centre of all this activity was at first the Mediterranean, which seems to have been the original home of the White man, as tropical Africa was of the Black man and continental Asia was of the Yellow man. For **racial colour** is the result of the condition of the blood. Heat and moisture dilate the blood vessels and, as it were, normally congest the liver, which has to dispose of the increased supply of blood with its increased supply of colouring matter. Consequently, in the tropics, almost all life, whether man or beast or bird, presents a strong development of colour. On the other hand, the air of Europe contracts the blood-vessels, and diminishes the amount of blood to be distributed. Between these two extremes, there is the dry, hot air of continental climates, which produces the olive or copper hue found in the natives of Eastern Asia or North America.

At first sight, it may appear strange to describe the Mediterranean as the home of a race of men; but the appearance of the world was very different ages ago from what it is now. The Sahara was a sea; Europe and Northern Africa were continuous; the Arctic Ocean extended down into Asia as far as its remains still exist in the Caspian and the Aral seas; and Arabia and the Deccan were islands. Thus, the White man was separated from the Black man by sea, and from the Yellow man by the impassable obstacle of the Pamirs. Of course, in the tropical *islands* of India and Arabia and in the semi-tropical peninsula of Egypt, the White man became "sun-burnt" compared with his brother in Northern Europe; but he never lost his wavy hair or his narrow nose.

THE BIRTH OF A CITY.

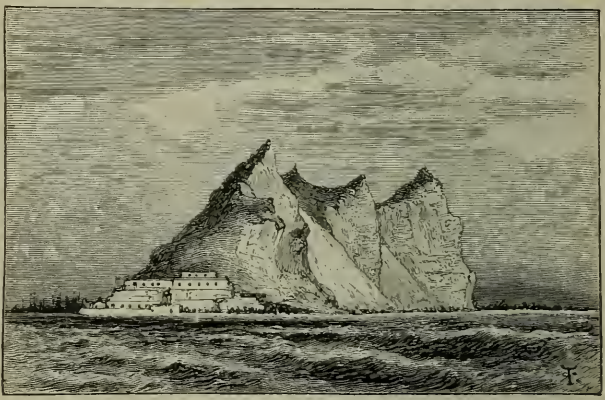
THE life of a city presents some points of resemblance to that of a human being, and may be divided into similar stages—birth, growth, maturity, decay, and death.

Man is a social animal both by nature and by necessity ; and, where either nature or necessity has caused him to congregate in large numbers, there we have a town or a city. Necessity has been the more influential of the two causes. The natural desire for companionship is easily satisfied, especially in primitive times; but, for trade or for safety, numbers are practically necessary.

Thus, we find that in early ages the savage hunter or fisherman, from the very nature of his occupation, followed it more or less **alone** ; but, when the food had been once procured, he needed some safe centre at which to store it for future use. That centre had to be both easy of access in times of peace, and easy of defence in times of war.

Easy access implies a natural roadway, a **line of least resistance** to communication, *e.g.* a river valley or a mountain pass—the approach to an Inverness or a Peshawar ; and easy defence implies the protection

of hills or the isolation of water—a Gibraltar or a Stockholm. Thus, the country between the Alleghany Mountains and the Great Lakes was an ideal region for the Redskins; and promontories like that of Keeweenaw on Lake Superior, or islands like Manitoulin on Lake Huron, were ideal localities within that



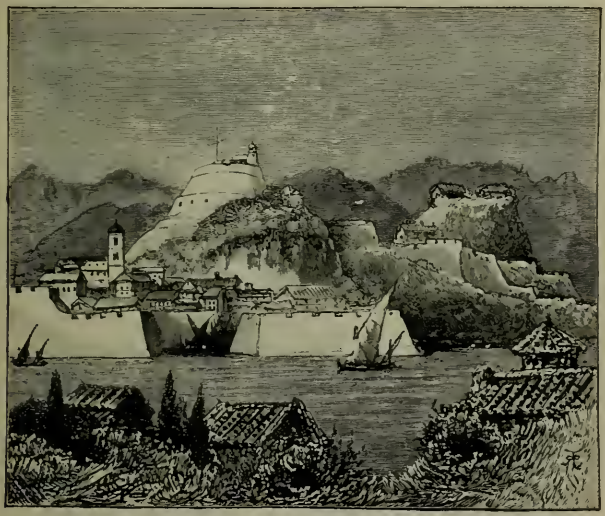
GIBRALTAR.

region. The expanse of water on the lakes and the absence of trees on the prairies rendered such places easy of access in peace, and guaranteed them against surprise in war. So, too, Venezuela received its name —"Little Venice"—from the Indian villages which the Spaniards found built on piles out into Lake Maracaibo.

Even amongst people much more civilized than these Indians, similar precautions were taken. For instance, the **Phoenicians** almost always built their cities either on some rocky island near to the coast or on some headland joined to the mainland only by a low and narrow isthmus. This secured safe anchorage

for their vessels, and a barrier against the barbarous inhabitants of the mainland. Thus, the word *Tyre* means "a rock," and the place was a rocky island; the word *Sidon* means "a fishery," and the place was, again, an island close to the shore.

The same characteristic features are found in the great Phoenician colonies, *e.g.* Cadiz, Carthagena, and Phoeniki. The last is the Cretan town mentioned in *Acts* xxvii., 12; it is a promontory with a double harbour, and is now, as it was in St. Paul's time, much the best refuge on the south coast of Crete.



CORFU.

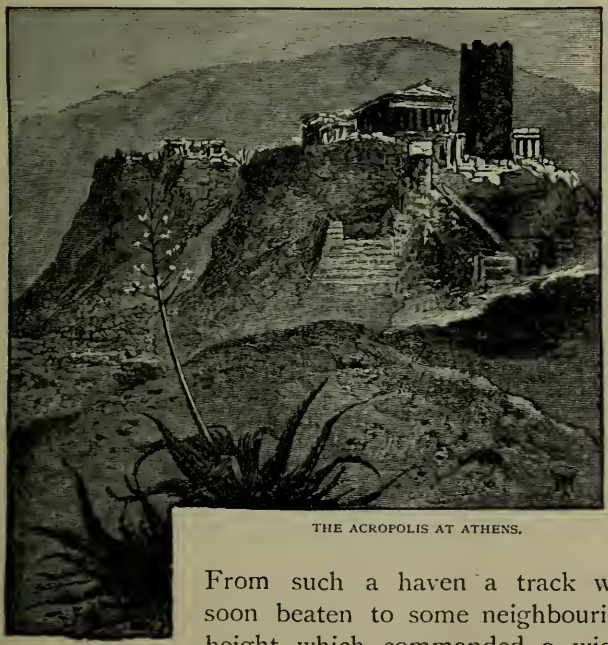
Cadiz and Carthagena are both on small islands near the shore.

Of course, the **density of population** varied with the richness of the place in game or fish. Abundance of deer or wild pigs would soon give rise to a Derby

PORTSMOUTH.

or a Swindon, as abundance of eels would to an Ely. The products of the prairies were few and far between, and therefore the population was naturally scanty and scattered ; but the population on a small and fertile island, *e.g.* Corfu, Zante, or Syra, was naturally so dense that the whole island might be looked upon, and was looked upon by the Romans, as a single town.

Naturally, every one preferred to land at the easiest and safest place ; and thus all boats began to frequent a Portsmouth, a Hythe (= haven), or a Le Havre.



THE ACROPOLIS AT ATHENS.

From such a haven a track was soon beaten to some neighbouring height which commanded a wider view, *e.g.* a Monte Pellegrino at Palermo, an Acropolis at Athens, a Castle Rock at Edinburgh ; and this track

was the future "*High* Street" of the city. Along both sides of it huts and houses began to spring up, and we have **the Birth of a City**.

All this is obviously an instinctive and unconscious process, and there is nothing in the least artificial about it. We shall have subsequently to consider the artificial production of towns, *e.g.* by a king or a capitalist; but at present we may confine our attention to their natural growth.

From what has already been said, we may infer that a main cause of such growth is any **facility for obtaining food,** either by land or by water. The land must have a sufficiency, without an excess, of moisture by rain or river, and a soil that is fertile without being heavy or hard to work. This would naturally draw men to a river plain at some distance above its mouth or deltaic portion, *e.g.* the Carse of Stirling or the plain of Strathmore. The water must have abundance of fish and safe harbours. Thus, Berwick, Scarborough, and Great Grimbsy, began their "lives" as havens for fishermen; *Lisbon* and *Tagus* are both Phoenician words, the former meaning "a walled town," and the latter "a fish river."

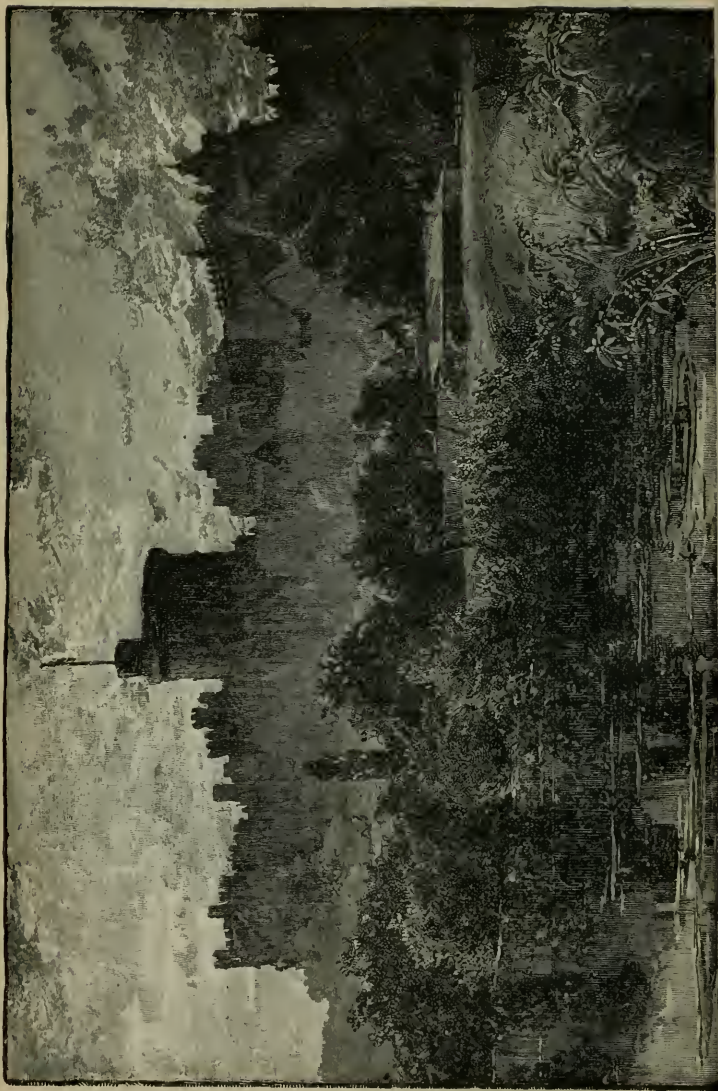
Another factor in the choice of a site for a city was its **capability for defence**. This was best secured by water or by height; and, if the two could be combined, the place very quickly rose into importance. Athens and Dumbarton did combine them; Stirling and Sion, though protected only by a river—the Forth and the Rhone—added to their height the advantage of having a fertile plain round them. On the top of the height a temple would be built to the protecting deity, *e.g.* a Parthenon.

Sometimes this order of things was reversed, and

the city was attracted to a place which had already become **sacred** for some reason or other. Thus, Catania seems to have received its name from its nearness to Mount Etna, under the shelter of which

OXFORD CATHEDRAL.

it was built in order to be protected by the "Gods" from within the volcano, and to reap the fertile plain to the south, *i.e.* the sunny side. Similarly, Delphi, now Kastri, sprang up where the sacred Castalian



Fount breaks out from the southward slope of Mount Parnassus.

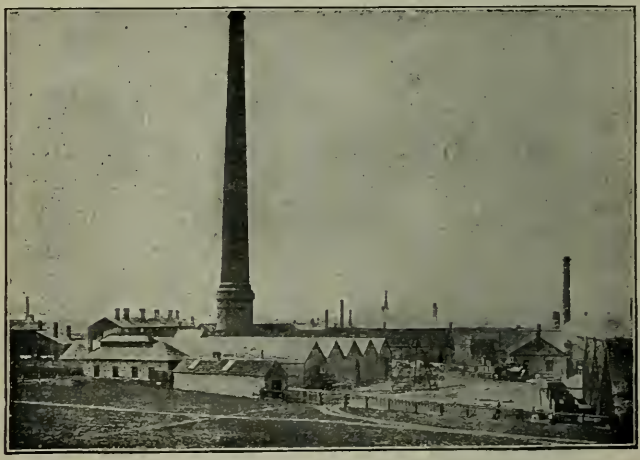
The names of Bethel and Holy Island, Kirk-wall and Dun-kirk, Ax-minster and Kidder-minster, speak for themselves; Wednesbury and Thurso recall the worship of Woden and Thor in Staffordshire and Caithness, as Baalbek and Herculaneum recall that of Baal and Hercules in Syria and Italy; St. Malo and St. Bees commemorate the life, as St. Albans and Bury St. Edmunds commemorate the death, of early Christians; Llandudno and Llanberis grew up round Llans or "sacred enclosures," as Oxford did round the shrines of St. Frideswide and St. Osney, and Glasgow round the shrine of St. Ninian.

As soon as **trade** began to spread, superstition, social instinct, and desire for safety, became less important than the existence of some natural wealth or convenience for transport.

Natural wealth in the earliest times often meant a bed of **flint** for cutting and sharpening weapons, or a bed of **clay** for making household utensils. Thus, the densest population in England in the earliest times was found on the chalk formation which runs from Dorsetshire to Norfolk, for it was rich in flint. The formation was too hard for agriculture, but was admirably suited to the pastoral pursuits of the early inhabitants. Therefore, it was the natural route for the famous Icknield Street, and the natural site for the early centres of "civilization,"—Stonehenge, Salisbury, Winchester, Windsor, Stourbridge, Thetford, and Norwich. Stourbridge, which is close to Cambridge, near one end of the line, and Winchester near the other end, were the scenes of the two great national Fairs in early England.

Parallel to this chalk, but more to the south-east, runs the line of clay which has made the Poole district so famous, and on which there sprang up such centres as Southampton, London, and Colchester.

Another very important product in early times was **salt**, as all meat for winter use was salted; and the importance of the rock-salt centres under the Saxons may be inferred from their Saxon names—Northwich, Nantwich, Middlewich, and Droitwich.



SALT WORKS.

Salt could also be made, as it still is, even in Scotland, *e.g.* at Preston-(salt)-pans, round the coast, to which fact, indeed, we owe the word "*bay*-salt"; and this led to a considerable development in coasting trade, especially in connection with fish. Thus, Bristol owed its rise to the salmon fishery in the Severn; Saltash is still a place of some importance on Plymouth Sound; and all the other early ports were

developed in a similar way, and all are situated either in the chalk or in the clay formation. Weymouth, Southampton, Winchester, Shoreham, and Dover, were the most important on the south coast ; Sandwich, Margate, Colchester, Harwich, Yarmouth, Norwich, and King's Lynn, on the east coast. And the trade from Lynn soon spread to Boston and Hull.

SALT WORKS.

These ports subsequently developed a very large trade, respectively in French and Spanish or in Flemish and Hansa-Town goods ; but at first they were confined to coasting trade, and the need for coast lights led to the maintenance of huge fires on some "head" or "nose" of land, such as *Flam*borough Head or *Fur*ness.

The internal trade was done by road or river, by the former especially in southern and western Europe. This was mainly due to the influence of Rome. The

old civilizations of Egypt, Babylon, and Assyria, arose in the warmer parts of the temperate latitudes ; and their characteristics were fluvial. That is to say, their land was subject to annual inundations, on which the whole fertility of the soil depended. But this was not the case in the colder parts of the temperate latitudes, where the most advanced civilizations are now to be found. There forests had to be cleared, and marshes to be drained, before the country could be properly inhabited ; and this work would only be done by some imperial race, probably by one which had laid the foundations of its empire in warmer and drier climates.

As we have already seen, the **early inhabitants of England** lived on the chalk uplands, where the thin soil was suitable for pasture and easily cleared of forest, and where flint was abundant, *e.g.* the Downs of Kent and Wiltshire, and the similar lands between Hunstanton Point and Portland Bill. The rest of the country was divided up into isolated " downs " surrounded by dense forest and deep marsh.

This was repugnant to the **imperial instinct of Rome,** and her first work was to unite the whole country by a system of bridged roads defended by fortified camps. The names of Lancaster and Doncaster, Chester and Rochester, Worcester and Exeter, mark the sites of such camps. Chester may be taken as a type. It sprang up on a river plain, which is still famous for its fertility, though the Dee itself has been terribly silted up. A sandstone crag rising out of the plain offered an ideal site for a " camp," the old foundations of which still remain almost intact.

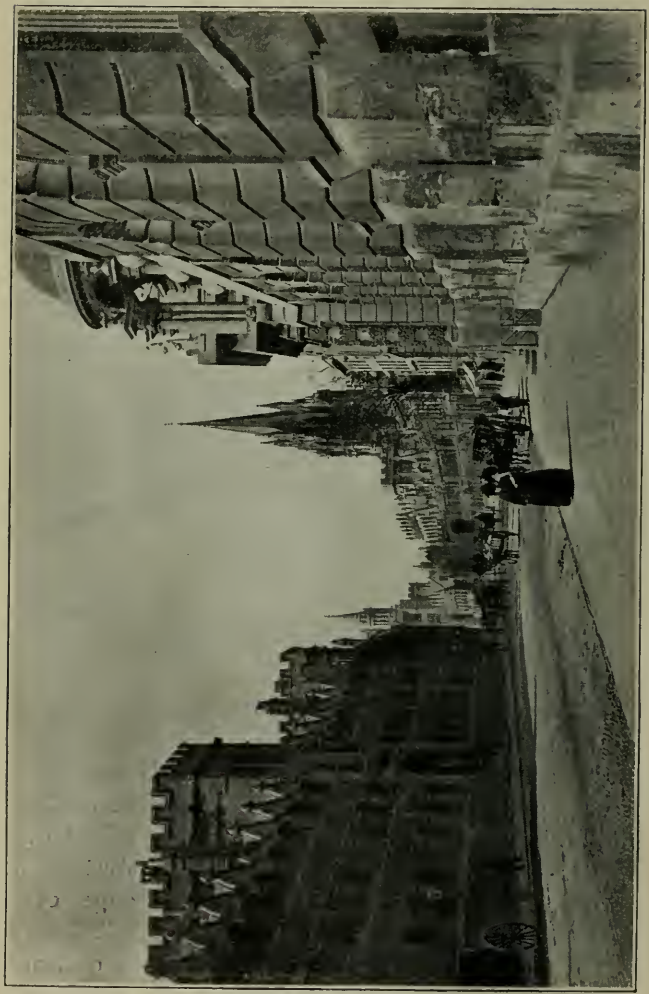
Such a situation is already familiar to us. It commended itself to Roman and Teuton alike. The Romance peoples preferred an entirely military or-

ganization, as in the castles of Castile; the Teutons preferred a civil organization, as in the fortified burghs of Burgundy. The different methods of fortification, *e.g.* by stockade, weir, or mound, are preserved in the names of Tavistock and Basingstoke, Tamworth and Kenilworth, Jedburgh and Peterborough.

War, indeed, supplies the earliest illustrations of what we have called the conscious or artificial birth of cities. Thus, the distance between Roman camps was decided by the ordinary day's march. Even in Domesday Book, London is still the real centre of a triangle of strongly fortified towns—Oxford, Colchester, and Canterbury—at a direct distance of about 50 miles; while Leicester, Nottingham, and Lincoln, are stages on the way to York. So, convenient stages fixed the site of Orleans, Tours, Poitiers, and Angoulême, between Paris and Bordeaux—of Breslau, Glogau, Frankfurt, and Stettin between Troppau and the Baltic—of Lemberg, Czernowitz, and Yassy, between Cracow and the Black Sea.

As these stages vary with the **means of locomotion,** the communication between them is largely by artificial means—roads, railways, and canals. Such means are obviously artificial in themselves, but they must follow natural lines. Thus, it is natural for the roads or railways across a plain to meet at such centres as Moscow, Berlin, and Winnipeg—for such cities as Tiflis, Turin, and Quetta, to spring up at the foot of a mountain pass—for markets like Damascus, Timbuctu, and Lahore, to collect merchandise on the edge of a desert across which there is any trade at all.

Rivers, however, provide a natural means of transsport as well as a natural "line of least resistance;" and the suitable sites for cities are obvious. For instance, a



OXFORD, HIGH STREET.

confluence at once gives a larger choice of routes than a single river does, as at Allahabad, Belgrade, Adrianople, and Nijni-Novgorod; the name of Coblentz (= confluence) speaks for itself as clearly as that of a Snowdon, a Buenos Aires, or a Monte Video could.

A marked bend in the general course of a river has almost the same effect as a confluence, except that merchandise will have to be forwarded by some other means. Thus, Kalach gets the Volga traffic from Tsaritsin by canal, and Adelaide gets the Murray traffic from Morgan by rail, as Varna gets Black Sea traffic to Rustchuk at the expense of Galatz.

Amongst **other suitable sites** are places where navigation begins or ends, where a river can be bridged or forded, or where rapids necessitate a trans-shipment of goods. Thus, Pauillac and Bremerhaven are at the head of navigation for large vessels, as Ulm and St. Paul are for small vessels; Buda-Pesth is the lowest point at which the Danube could be bridged at all, and Magdeburg is a point where the Elbe could be bridged very easily; Bedford is just above unfordable water on the Ouse, as Stratford is on the Avon; Portage la Prairie is the significant name of a station in Manitoba where the Canadian Pacific Railway crosses the Assiniboine river.

Such cities are of **partly natural and partly artificial growth**, the latter when the site is obviously unfavourable; and this has been the case continually in connection with mining. The presence of gold will cause a city to spring up "in a day" anywhere—beside the icy waters of the Fraser, between the towering cañons of the San Joaquin, upon the dreary veldt of Johannesburg, beneath the lofty peaks of Colorado, among the burning sands of Coolgardie, or in the steaming

gullies behind Cairns and Cooktown. And it is very much the same even with less important metals.

For **the capitalist** is as absolute as the king. A monarch may command the building of a St. Petersburg, a Constantinople, or an Alexandria ; a mining syndicate or a millowner can do as much. Such mediæval village magnates as Brian of Manchester, Hodgkins of Halifax, and Cuthbert of Kendal, had rivals who founded the villages of Bolton, Leeds, and Bury ; Diamantina, Ironton, Leadville, Ouro Preto, Silverton, and Tenterfield, are the creation of the more modern capitalist.

Of course, in the case of minerals, especially gold and silver, there is a species of "**natural monopoly**"; and that always attracts the capitalist, even in comparatively unimportant industries, *e.g.* pumice-stone and alabaster.

Pumice is found wherever the escape of gases has rendered lava light and scoriaceous ; but the only kind which enters into commerce, is that from the island of Lipari. This has attracted to Carnato a colony of Italian capitalists, who have a practical monopoly. Similarly, alabaster is found in many places and of many varieties, the alabaster of the Bible coming from Egypt ; but the only genuine alabaster is Italian, and comes from Volterra and other outlying districts of Pisa.

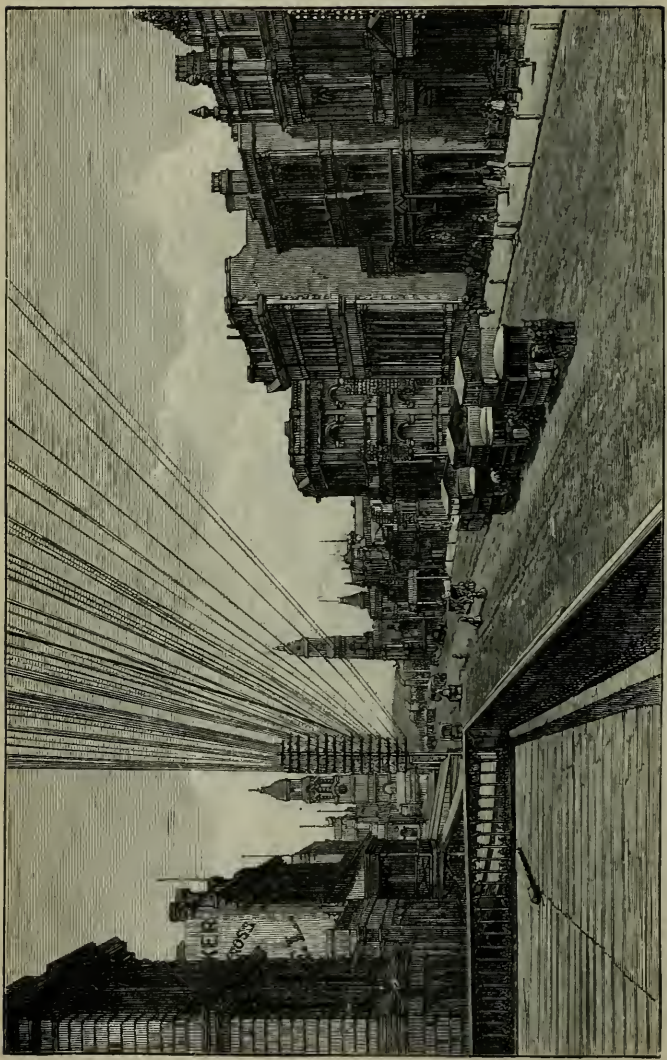
To a certain extent, therefore, **any natural advantage is a monopoly.** For instance, the merchants of Hiogo and Osaka can monopolize the export of imitation-leather wall-paper, because its manufacture depends on the supply of a certain bark which is native to Japan.

So, too, **facilities for transport** have made Kiev

the most important town on the Dnieper, for, though little use is made of the banks of the river for manufacturing purposes, its course is the natural channel for the pilgrims and for the grain and wood trades of south-west Russia. It is to the water-power, too, that the neighbouring towns of Kremenchug and Ekaterinoslav owe their huge timber industries. Of course, Ekaterinoslav possesses also many rich deposits of iron. Indeed, the whole district is called the "Black Country" of Russia; and the combination of facilities for obtaining transport, water-power, and machinery, have so developed the milling industry of the town that it is called the "Russian Buda-Pesth."

A similar principle may be illustrated from the **import of eggs** into England. No doubt, enormous quantities are imported, some even from places as far away as Trebizond; and we do not seem to be very particular about the quality. For instance, the fowls of Trebizond gorge themselves in the spring on the anchovies which are scattered over the fields as manure; and, though that fact is quite obvious to the ordinary British palate, London alone imports considerably more than 100 *tons* of Trebizond eggs every year.

But amongst the conditions essential to **successful poultry farming** are perfect cleanliness, personal supervision, and a dry climate. Now, cleanliness and attention to small details are eminently characteristic of the French peasant; and in the north of France there is a low, dry plain, protected on the north by the hills of Normandy and on the west by those of Brittany. Across this plain runs the important military railway from Paris to Brest, branches from which give direct communication with St. Malo and



ADELAIDE.

Cherbourg; and, where this line crosses the Sarthe and the Mayenne rivers, the towns of Le Mans and Laval have sprung into importance in connection with the export to England of eggs and poultry.

In this the **influence of the railway** is obvious, and the rapid growth of many of our modern towns is due to such influence. Towns like Crewe, Winnipeg, and Le Creuzot, owe their very existence to railways; and great central termini like Melbourne and Sydney owe much of their growth to the same cause. This helps to account for the speed with which the two latter towns have outstripped Brisbane and Adelaide. In Victoria and New South Wales all the lines radiate from, or are directly connected with, the capital; for instance, the Murray is tapped directly from Melbourne in no less than six places, including Echuca.

In Queensland and South Australia an entirely different plan is in vogue. **Isolated lines** run inland from various ports, *e.g.* Townsville, Rockhampton, and Maryborough, or Wallaroo, Port Pirie, and Port Augusta; and this causes the expense of working the lines to be proportionately higher. That is to say, the proportion of working expenses to gross earnings is less on the centralized systems of New South Wales and Victoria than on the isolated systems of Queensland and South Australia.

It is in the United States, however, that we find the most extraordinary growth of transport towns, *e.g.* St. Paul and Chicago.

Less than fifty years ago **St. Paul** had a population of 400. It is now by itself a city as large as Florence or Chemnitz in Europe, as Agra or Damascus in Asia; and, with its twin-city of Minneapolis, it is larger than San Francisco, and nearly as large

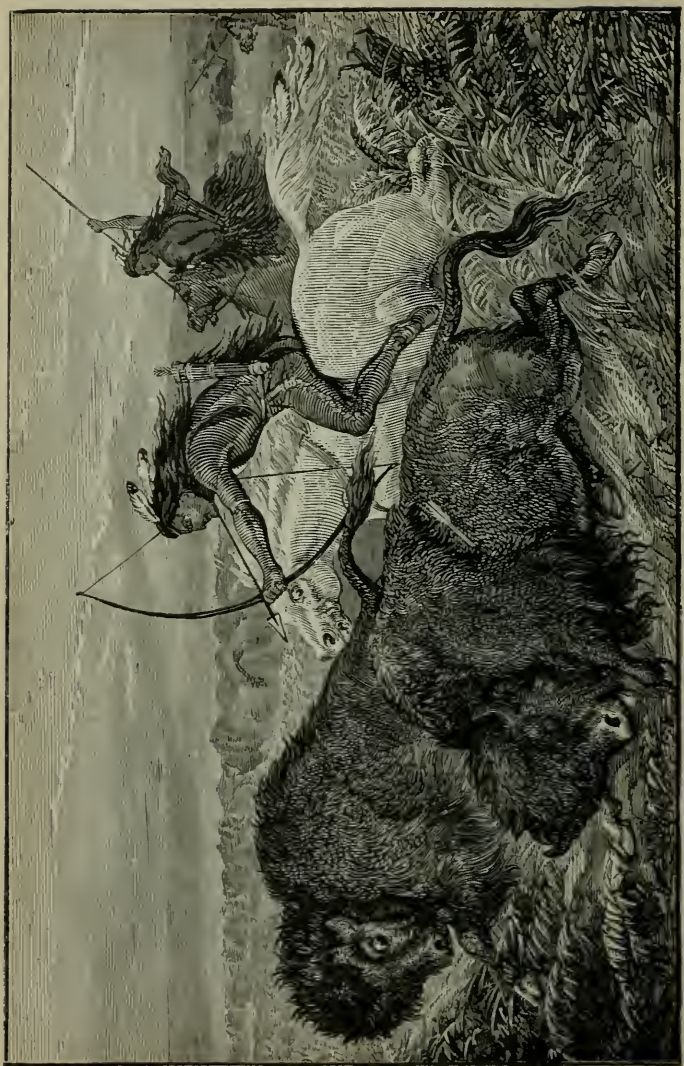
HEAD OF NAVIGATION ON THE MISSISSIPPI.

as Prague or Dublin. It stands at the natural head of navigation on the Mississippi; to the north the Red River drains into Lake Winnipeg, and to the east the St. Louis drains into Lake Superior. In early times this water traffic was very useful to the "frontier" traders; to-day the city is the centre of literally thousands of miles of rail, and the competition of the water traffic has so reduced the railway rates that the place has become the commercial centre for the whole of "the Great North-West."

Chicago presents an even more extraordinary spectacle. In 1830 it was a hamlet of a dozen houses in a wild prairie frequented only by the Red-skin and the Buffalo; to-day it covers an area half as large as the county of Midlothian. Then its population was 70 souls; now it is a metropolis larger than Tokio, and almost as large as Pekin. In 60 years it has multiplied itself 20,000 times! The main cause is transport.

It is interesting to turn from this to two places which seem to be on the verge of a development very similar in kind, if not in extent—Archangel and Esperance Bay. The former is one of the oldest harbours in Russia, and used to be by far the most important; the latter is a practically unknown inlet on the Great Australian Bight.

Archangel is being connected by rail with Moscow *via* Vologda and with Perm *via* Viatka, and the latter route opens up immense possibilities. Transport (by water) from Perm to St. Petersburg takes at present about three months; the railway will reduce that to two weeks. The rate by rail will, of course, be dearer than that by water; but this will be fully compensated by the lower rents at Archangel for storing cargo.



THE INDIAN AND THE BUFFALO.

Already, even under the present agricultural conditions, the Governments of Tomsk and Tobolsk produce annually about 400,000 tons of grain more than they need for local use. When Archangel is in direct connection by rail with these Governments and with the Volga, Kama, and Viatka basins, the famished fishermen of the north will have cheap bread for their families and cheap salt for their fisheries; their fish and furs and forest products will be brought within reach of the south; and the world will have tapped the granary of Western Siberia.

Esperance Bay is three days' sail from Adelaide, four from Albany, and six from Fremantle; and the distance by land from Coolgardie to the Bay is about 100 miles, compared with about 400 miles from Coolgardie to Fremantle.

At present the traffic to Coolgardie has to go from Adelaide to Fremantle, and thence across what is practically 400 miles of desert between Perth and Coolgardie. That means that, if a railway were built from Esperance Bay direct to Coolgardie, it would save some four or five days and nearly half the present cost. A number of gold "claims" are already being worked between the two places, amongst the rest some on the outskirts of the Norseman Reef. This is said to be the richest reef ever found in Australia; and, as soon as it begins to be properly worked, the traffic *must* go to Esperance Bay.

Under such circumstances the gain to one place must, as a rule, involve loss to another; and, if the blow is severe enough, it may reduce a flourishing town to ruins. This may be seen on a large scale in connection with such revolutions as the **substitution of steam for water-power**, or of coal for wood as fuel.

For instance, the valleys of the Aire and the Calder are dotted over with the crumbling ruins of old village water-mills, the industry of which had to give way before the advance of steam, just as the iron industry of Sussex, Herefordshire, Monmouthshire, and Shropshire, was killed by the substitution of coal for wood in smelting.

The same principle may be seen working in individual instances either from natural or from artificial causes. The latter have generally been connected with the **caprice of a tyrant.** For instance, the carpet industry of Axminster and the lace industry of Honiton were introduced into Devonshire by refugees from such towns as Valenciennes and Alençon. So, too, Antwerp owed its rise in the sixteenth century to the action of Maximilian, who punished the inhabitants of Ghent and Bruges for a rebellion by blocking up at Sluys the canal which connected Bruges with the Sea. Under happier auspices Khama, the Christian gentleman, moved his capital bodily from Shoshong to Palapye, where on a fine sandy soil his subjects can get pure air and pure water.

The influence of another dusky potentate, who would not have shone beside the monogamist chief of Bechuanaland, caused the manufacture of **attar of roses** to be transferred from Syria to Bulgaria. The direct route from Bucharest to Philippopolis crosses the Balkans by the famous Shipka, or "Wild Rose," Pass and near the southern end of the pass there stands the little town of Kazanlik, which was, therefore, within easy reach of Constantinople even before the construction of the railway up the Maritza valley to Sofia. This proximity to Constantinople, and the suitability of the site for rose growing, caused the

southern slopes of the Balkans to be planted with the Damascus, or "Damask" rose, in order to supply the ladies of the Sultan's harem with attar of roses.

In the Kazanlik district five thousand million to six thousand million roses are produced every year over a belt of upland about seventy miles long by ten miles broad; and yet the valley of the Tunja is not nearly so famous for scent as the **valley of the Var.** In the latter the field of flowers covers only some 3000 acres, but from this most of the perfumes in use throughout the whole world are manufactured. It is certainly very favourably situated, on the sunny northern shore of the Mediterranean, where it can supply perfume to the soap works of Marseilles, and obtain from them the fat required in the scent factories.

But the **coastal valleys of California** have a still better soil and climate; and, therefore, the Californian flowers are more burdened with oil, and have a more powerful perfume. Indeed, it is this which causes the Californian honey to rival that of Hymettus or Chamouni or Narbonne in delicacy, and that of Atacama in colour. Of course, animal oil is also essential to the manufacture of scent, that of the musk being preferred on account of its extraordinary tenacity; but the beaver and the civet are very useful, and the former is more common in California than the latter is in Algeria. Consequently, it is very probable that San Francisco may, in the near future, become the great scent market of the world. It only needs the interference of the capitalist; and the Golden Gate is not much farther from the Mormon paradise of Salt Lake City, than the Golden Horn is from Kazanlik!

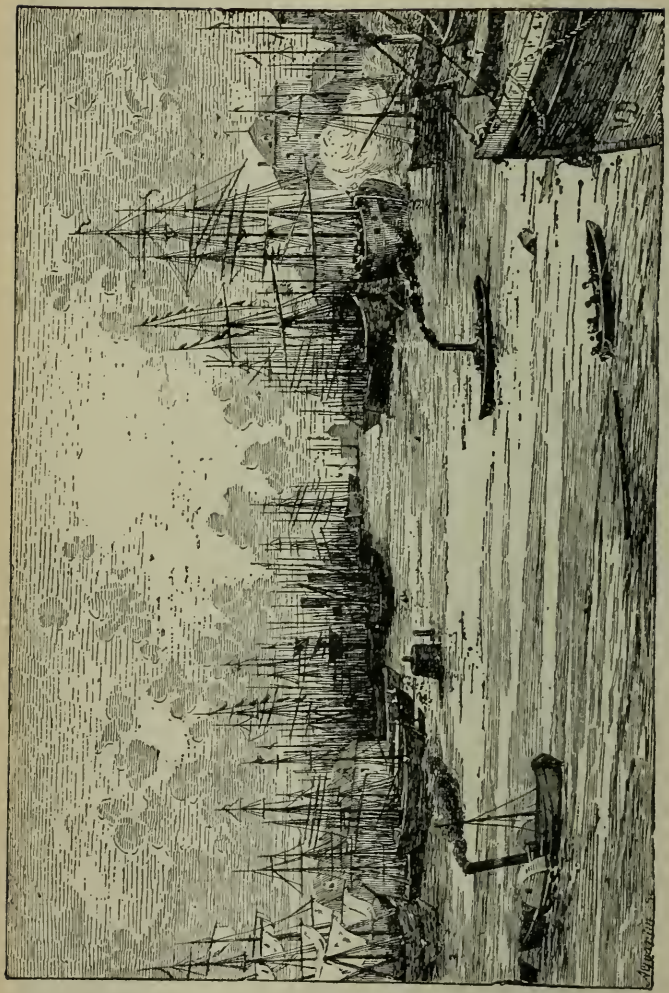
Another illustration of the power of **the capitalist**

may be seen in Colombia. Cartagena is one of the best harbours along the whole coast of South America, and in former times it had no rival as a trading centre; but it stands about sixty miles distant from the Magdalena river, which is the chief artery of commerce. With the building of Barranquilla at the mouth of the river, therefore, the commercial supremacy of Cartagena vanished; and there was no possibility of its reappearing unless, and until, its harbour was once again connected with the main line of commerce. This has now been done by a railway, and already the city is regaining all its old importance.

This last instance practically involves the question of **deep-sea opposed to river harbours**, which has caused so much distress in the neighbourhood of many old river harbours, *e.g.* Surat. The rule has been that a river harbour must either improve its accommodation to suit the much larger type of vessel now in vogue, or give place to a deep-sea harbour, generally one lower down on the same river. Thus, Bordeaux is being supplanted by Pauillac, Nantes by St. Nazaire, Bremen by Bremerhaven, Hamburgh by Cuxhaven, Stettin by Swinemünde, and Bristol by Avonmouth, just as Cairo has already been supplanted by Alexandria, Goole by Hull, and Stockton by Middlesborough.

There are, however, **some exceptions** to this, notably in the case of Glasgow, Buenos Aires, and Rouen. Buenos Aires has held good its position against La Plata, and Rouen against Le Havre, as Glasgow has against Greenock; and in each case the cause is that the river harbour has improved its facilities for shipping, and possesses much superior facilities for distributing goods.

Of the three cities **Glasgow** possesses most of the



HULL HARBOUR.

essentials to a successful port: it is the centre of a dense population; it is easily accessible from the ocean by large vessels; it has direct communication by canal or rail from the quay to all parts of the country; there is certainty of return cargo being obtained without much delay or difficulty; the port charges are moderate; there are many facilities for docking and repairing vessels; and it is on a coal and iron field.

Of course, the question becomes entirely different where the ports are only doing a **transit** trade, as, *e.g.*, in Mexico. Owing to the unhealthiness of the coast districts, and the consequent concentration of population on the central plateau, most of the Mexican ports are merely landing-places from which to dispatch goods up country. Certainly, the fertility of the soil and the consequent concentration of people round Vera Cruz, Tampico, Mazatlan, and Guaymas, have given these particular ports a commercial importance of their own; but the extension of the east-coast railway to Guadalajara is ruining ports like San Blas and Manzanilla.

The case of Rouen is particularly interesting, as it illustrates the whole principle of the **internal trade of France**. For it is a great meeting place of trade routes—by sea, by rail, by river, and by canal; and the four are very closely connected. Three of the great railways of the country meet at the double harbour of the city; one part of the harbour is for sea traffic, the other for traffic by river and canal. The natural river traffic is confined to the actual basin of the Seine, but towns far beyond the limits of that basin draw their heavy goods from Rouen by canal; and in the case of towns like Nevers, Roanne, or

Besançon, the canals have to cross hills as high as the Cotswolds.

In a word, these waterways are so excellent, besides being free from tolls, that importers can absolutely **disregard distance.** For example, feldspar is imported from Norway *via* Rouen to the button factories in the valley of the Loire instead of being brought from the Limousin hills, which are positively nearer to the factories than Rouen itself is ; and the reason simply is that the physical obstacles of the Auvergne plateau and, specially, the pace of the Vienne and the Creuse rivers have prevented canal construction between Limoges and Bourges. For the same reason Poole and the Cornish ports are able, at the expense of Limousin, to supply Alsace with kaolin, *via* Rouen and the canal which joins Nancy to Châlons-sur-Marne; and it is to this same canal that the development of the iron and salt industries of Nancy is due.

The reasons why the basin of the Seine is so much more useful than the basins of the three other great rivers of France, are again the result of the **physical formation.** In the first place, the Seine and all its tributaries except the Yonne rise at a low level, and flow through permeable strata, which moderate their floods and regulate their volume ; but the Loire, the Garonne, and the Rhone fall from a great height, and flow through impermeable strata, which can neither check flooding nor regulate their volume. In the second place, while the Seine is connected with the waterways of neighbouring countries at no less than fourteen points, the ramparts of the Alps, the Cevennes, and the Pyrenees, effectually cramp the canal systems in the basins of the Rhone, the Loire, and the Garonne.

All these advantages converge on **Rouen**; and thus

the city has been able to save itself from being overwhelmed by Paris or handicapped by Le Havre. Indeed, the importance of its position even in very early times is proved by the fact that it was the capital first of the Northmen and then of the Dukes of Normandy ; and its history illustrates many of the principles which, as we have seen, influence the birth of a city. It even possesses what most of the "cities," which we have mentioned, do not possess, *i.e.* a cathedral, under the shadow of which Joan of Arc was burnt ; and it is often, but erroneously, supposed that it is only the possession of a cathedral that gives any place the technical right to be called a "city" at all.

BREAD AND MILK.

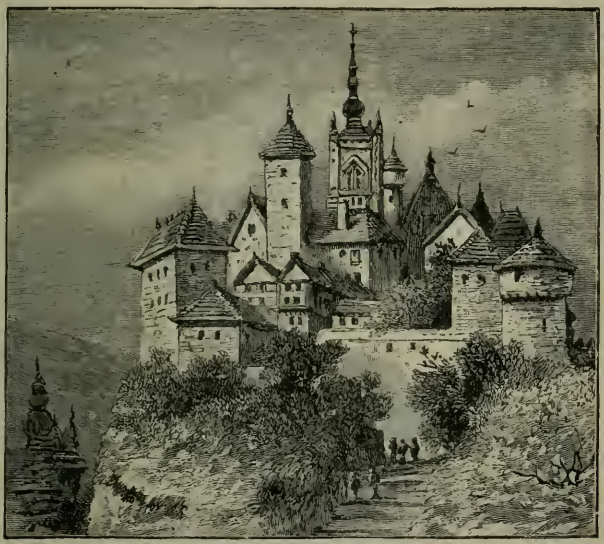
HUMAN wants are as varied as men's dispositions: but everywhere air is the first, and food is the second, necessary of existence.

The **air** we generally take for granted; but it is obviously impossible to get it pure in a town like Manchester, and very difficult to get it at all at the bottom of a mine 4000 feet deep. This extreme depth is very rarely reached, *e.g.* in mines near Berlin or near Prague; but it is certain that in any large town in a mining district the quality of the air both above and below ground most seriously affects the population.

Moreover, its physical effects are not the worst. In the yearly returns of **crime** such towns occupy most unenviable positions. For instance, the country round Swansea, Cardiff, Merthyr-Tydvil, Aberdare, and Newport, has a terrible record for crimes against property and against the person; and the square enclosed by the four towns, Preston, Burnley, Oldham, and Liverpool, or by the four, Newcastle, Tynemouth, Darlington, and Middlesborough, has a similar record for drunkenness.

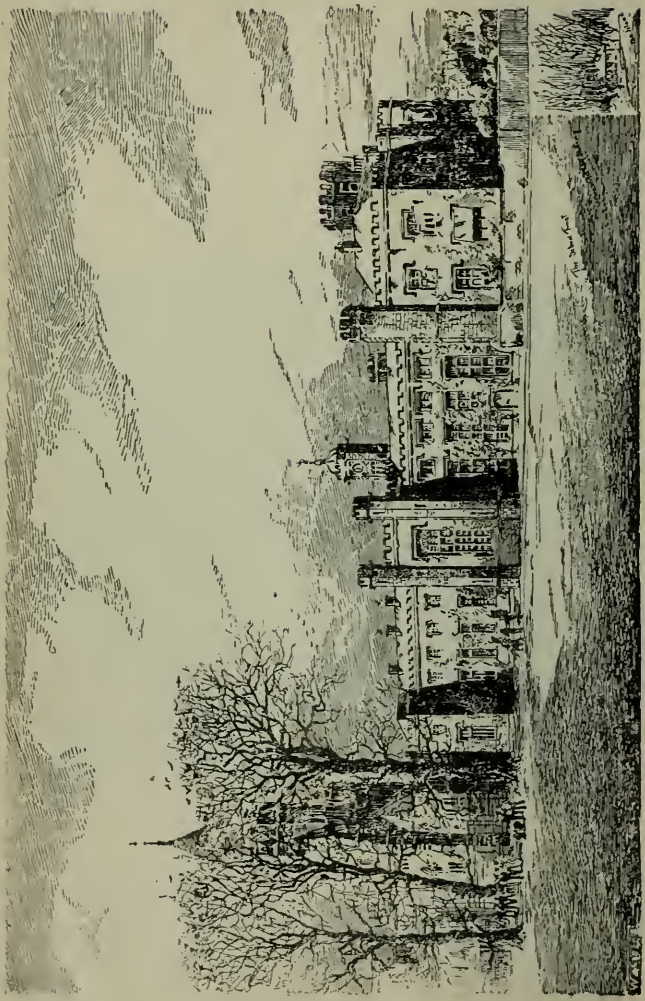
The Food varies with the climate. The Eskimo

would die if he did not gorge himself on animal fat; the Negro would die if he did. At present, however, we are concerned only with the food of the White Man; and it is interesting to notice that the latter has insisted on carrying his natural food with him all over the face of the globe. For instance, he took wheat to Central America in the sixteenth century, coffee to the East Indies in the seventeenth, and the pig to New Zealand in the eighteenth.



PRAGUE.

Of course, even within the limits of the White Race, there are very **different standards of comfort**, and very different ideas of what constitutes necessary food. For instance, the list of necessaries which contents an Icelander would have disappointed Diogenes, much more a nineteenth-century school-boy at Rugby or



RUGBY SCHOOL.

Harrow, at Sedbergh or Loretto. For the **Icelander** is practically contented with what his own island provides; and that island is little better than a desert. Its configuration and the barrenness of the soil make intercourse very difficult and the conditions of life very hard. The only really habitable portion of the country is a narrow strip of pasture-land round the coast and up the sides of the fiords; the interior is a waste of sand and ice.

Consequently, though **Iceland** is considerably larger than Ireland, its whole population only amounts to about 72,000. Roads and bridges scarcely exist; and, even if they did, the people are absolutely shut up by snow in winter. They have to feed and milk their animals, and to spin and weave their wool; but the rest of their time is enforced idleness, spent on books and chess. Every nail and pane of glass and bit of furniture possessed by one of the richer inhabitants have to be imported; and, as every one has the same products to sell, there is no home market. Even in Reikjavik trade is largely carried on without money; so many sheep or rolls of dried fish or bundles of hay are bartered for so much groceries and a book or two. With every opportunity and excuse for reading during the long dark winter, the little nation has become a nation of readers.

Speaking, however, for the average man in the geographical conditions natural and suitable to the White Race, his food does, or ought to, include **milk, bread, meat, fish, and fruit.**

Fortunately, for the British farmer, **fresh milk** is an article which will not travel. An attempt has, indeed, been made to import it—even from Melbourne—frozen; but there seems to be no probability of

this being a success, even from a much nearer harbour. Practically, foreign competition cannot enter into the fresh-milk trade at all, though foreign butter and cheese are very formidable rivals to our home products.

Consequently, the **milk trade** is one of great importance both to the farmer and to the nation. The increasing use of machinery, the cheapness of foreign flour, social and educational advantages, and other causes, are drawing the mass of our population into the large towns. For instance, in the days of Adam Smith the whole cotton trade of Lancashire employed only 40,000 people; now the six great cotton towns of Manchester, Salford, Oldham, Blackburn, Bolton, and Preston, have between them a population of considerably more than 1,000,000. And, taking the country as a whole, twenty-five towns alone contain more than 12,000,000 out of our 38,000,000 inhabitants.

For this **huge city population** our milk supply is miserably deficient. In a tiny country like Holland, which is only one-tenth the size of the United Kingdom, there are said to be 4,000,000 more milch cattle than in this country. Nor is this all. More than a quarter of our milk supply is used for making butter and cheese, though other countries can make both cheaper than we can.

For instance, the volcanic soil of **Victoria**, the smallness of the colony, the development of co-operative farming, *e.g.* round Benalla, the bonuses paid by the Victorian Government on butter sold in London or Glasgow, and the excellence of the railway accommodation, *e.g.* round Sandhurst, Castlemain, and Ballarat, have given such an impetus to the

butter trade that we imported in 1895 more than £750,000 worth of butter from Melbourne alone. The same causes are encouraging a condensed-milk industry, which will seriously affect the Swiss producers of that article.

So too with regard to cheese. **Ontario** lies in a comparatively low latitude—reaching even to that of Rome—which gives it a short winter; its position between the Hudson Bay and the Great Lakes combines the advantages of a marine and a continental climate; its soil is abundantly watered, and carries huge crops of grass and roots; its level surface is extremely favourable to canal construction; Toronto is the centre of a perfect network of railways in the south, and the main line of the Canadian Pacific Railway runs across the north of the province. Consequently, Ontario can export cheese, *via* Montreal, in tens of thousands of *tons*, cheaper and better than any similar make of cheese can be produced in this country.

But milk has a most unfortunate facility for absorbing noxious germs; and for this reason, if for no other, milk from foreign ports would always be an object of suspicion. It must not be inferred from this, however, that British milk is free from suspicion. Compared with **Denmark**, we are in a simply disgraceful condition. Indeed, in this respect, Copenhagen sets an example to the whole world, though the Dutch are not far behind the Danes. The Copenhagen Milk Supply Company has the most stringent regulations, sanitary and otherwise. Every farmer who undertakes to supply milk to the Company, is pledged to feed and treat his beasts in accordance with fixed, printed rules; and any unsatisfac-

tory contractor has his contract cancelled immediately. On the other hand, the Company pays the highest market price for the milk, and shares any loss in which the contractor may be involved—*e.g.* his own suspension from work if there is illness in his house or neighbourhood, or the destruction of diseased and suspected beasts—by strict obedience to the rules laid down.

AUSTRALASIAN ODDITIES.

Briefly, then, every country must produce its own supply of fresh milk; and the only question is with regard to the sanitary conditions under which it is produced.

Of course, other animals besides the cow give milk. Indeed, milk-giving animals seem to have existed for ages in every part of the world except Australasia.

This is not the only point in which **Australasia** contradicts the experience of five continents. It is a little world of its own, full of oddities. For instance, among its characteristic vegetation, flowers have no scent; ferns grow as tall as telegraph posts; trees throw no shadow; and cherries have their pips outside. Amongst its characteristic animals, the platypus lays eggs, and the kangaroo "walks" on two legs. Amongst its characteristic birds, the kivi wears hair instead of feathers; the emu runs instead of flying; eagles are white, and swans are black, and small birds do not sing.

With this exception, however, **milk-giving animals** have existed all over the world, as long as man himself has; and, next to the cow, the most important to man are the sheep and the goat, the horse and the ass, the dog and the deer, and the camel.

The story of the wolf suckling Romulus and Remus is simply a relic of an age when, doubtless, the milk of the dog or wolf was as regularly used by man as the milk of the sheep was a few years ago even in Wales and Scotland. So, too, the camel gives milk to the Arab of the desert, as the reindeer does to the Lapp of the Tundras; and the sheep and the goat, are amongst the mountains of Central Asia what the ass and the horse are upon the plains of Mesopotamia and Western Asia. Indeed, upon the Kirghiz Steppes mares' milk is even fermented into an intoxicating drink called "koumiss."

It is interesting also to notice the difference in the constituents of the milk. The dog or wolf is a native of the frozen north, and its milk is remarkably rich in fat; the horse and the ass are natives of the hot plains and plateaux between Abyssinia

and the Hindu-Kush, and their milk is conspicuously wanting in fat; between these two extremes comes the milk of the sheep and the goat, natives of regions where the heat of the latitude is tempered by the cold of the height—the Pamirs and the Rockies, Angora and Kashmir.

The question of **Bread** supply is very different. Here the scientific principle of *Local* Division of Labour at once becomes more prominent, especially with regard to wheat, the most important bread-stuff. Like the White Man himself, wheat readily adapts itself to local conditions, and presents many varieties suitable to different seasons and places; but it ought to be produced only in the places most suited to it, and such places are few and easily recognized.

For **wheat** is simply a cultivated grass; and, from the nature of the plant, it is top-heavy by the time it is ripe. In the first place, then, its roots need to be in a fairly stiff soil; and it can easily be injured by a wet wind. As a grass, however, it requires a considerable amount of moisture and abundance of sunlight; and the ordinary agricultural operations can be conducted with ease only in the absence of mountains and of rocky soil. From this we may infer that wheat will grow best on a warm, dry plain, which has a soil stiff enough to support the plant's roots and stem and to retain moisture. That is to say, we may reject all extremes of climate, for the damp heat of the Tropics will be as unsuitable as the dry cold of Arctic regions; within suitable latitudes we must find a plain far enough from the sea to be dry, but with enough vegetable matter in the soil to retain moisture; and, amongst such plains, we shall

give the preference to the one which has the richest soil and the easiest access.

A glance at a **physical map** will direct our attention at once to the Great European Plain, the prairies of North America, the pampas of South America, and the plains which stretch northward or southward from the huge watershed of Central Asia. And the question of water-supply, for irrigation or transport, draws special attention to the Volga, the Danube, the St. Lawrence, the Mississippi, the Plate, the Indus, and the Obi.

Further consideration suggests two inferences. The least populated of these regions ought to have the largest surplus for export; and the different latitudes, with their different times of harvest, ought to lessen competition. Thus, the Argentine harvest is in January, the Canadian in September; the Austrian is in July, the Siberian in October.

No doubt, wheat will, and does, grow well elsewhere, especially with **scientific tillage**, such as it receives in England and Denmark; but these river-plains offer the largest supplies for export, at the least cost, and have excellent waterways for transport. Denmark produces forty-two bushels to the acre, while Russia and India only produce nine apiece; but it cannot compete with either of the latter as an exporter.

As a matter of fact, the **three great exporting countries** are North America, South Russia, and Western India, for the Hungarian plain is comparatively small, and Siberia and the Argentine have scarcely come into the field yet as serious competitors.

The former three countries all possess the large dry plains and the navigable waterways necessary for

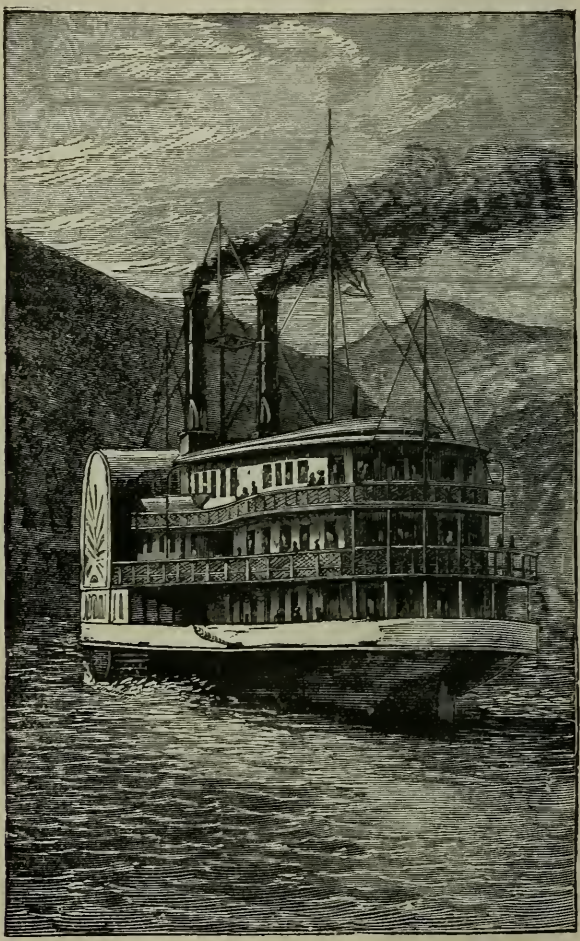
the purpose in view ; but, otherwise, there are many points of difference between them.

The **American** soil has been enriched for centuries with the ashes of prairie fires and with the bones and other refuse of beasts and birds, until its fertility has become quite extraordinary ; and it has been in use for only a small number of years, especially

SCIENTIFIC TILLAGE

in Assiniboia and Saskatchewan. The farmer in America farms very large areas of land, and can therefore use machinery with great advantage ; and he is quite willing and competent to do so. Moreover, he has every possible facility for transport by land and by water. Both the St. Lawrence and the Mississippi are navigable for 2000 miles up from the ocean, the former to the Manitoba lake-harbour of Port Arthur, and the latter to the Minnesota river-harbour of St. Paul.

The **Canadian** farmer has the advantage in climate. This is mainly due to the latitude. Paradoxical as it



MISSISSIPPI STEAMER.

sounds, the farther from the equator that wheat can

grow at all, the better it ripens ; for the pace of the earth's revolution, of course, varies with the circumference in the particular latitude. Consequently, any given area of land passes from under the sun's rays much more slowly in high latitudes than in low latitudes ; and the summer day varies similarly in length. Thus, the length of the day and the slow passage of the sun over the wheat cause the ripening to be very perfect ; and the same two factors enormously facilitate harvesting.

The high latitude, however, has disadvantages in the shape of summer frosts and floods.

The frosts are primarily due to the absence of mountains along the north of Canada, which allows the cold winds to blow down from the Arctic Ocean over the wheat fields ; and, unfortunately, they generally occur during the latter half of August, when the wheat is very nearly ripe, and when the long summer has dried up every green thing on the face of the prairie. Then, as there is no moisture left to be evaporated, the slightest breeze from the north nips the wheat.

There are, however, **several remedies.** One is planting shrubs or trees, which draw their moisture from the deeper layers of the soil, and therefore can resist the long-continued heat. Another is sowing early ; but, as that necessitates ploughing in autumn instead of waiting till the spring, it cannot be done always and everywhere. A third is using hardier seed, *e.g.* Fife or North Russian. The most obvious remedy however, is "smudge-firing," *i.e.* burning damp straw along the north side of the wheat on a frosty night. Straw is of no value in these districts ; and the frosts very seldom come *twice* in the same summer, and are practically confined to a particular fortnight.

MANITOBA WHEATFIELD.

The floods are due to several causes. One is the want of trees to check radiation at night ; and, of course, trees can be planted. Another is that ploughed land naturally presents a larger surface for evaporation than unploughed does ; but, as the area of ploughed land increases, the distribution of the rainfall will also be wider. The third cause is the absence of mountains along the south of Canada, which would prevent the sudden meeting of the cold northern winds with the warm southern winds just over the slight elevation that forms the international boundary.

To compensate for these disadvantages, the **Canadian** farmer has harder frost to clean and pulverize the soil, and more snow to sink into the vegetable mould and form underground reservoirs.

The **American** farmer, on the other hand, has the advantage in choice of routes for export. One route is from Duluth, Milwaukee, Chicago, Detroit, or Toledo, *via* the Great Lakes. Another is from Omaha, Peoria, Topeka, or Indianapolis, direct by rail to New York ; and the third is from Minneapolis, Cincinnati, and St. Louis, down the Mississippi.

New York is by far the most important wheat port in the States ; but Baltimore, Philadelphia, and Boston do a large trade on the east coast, and Portland and San Francisco on the west.

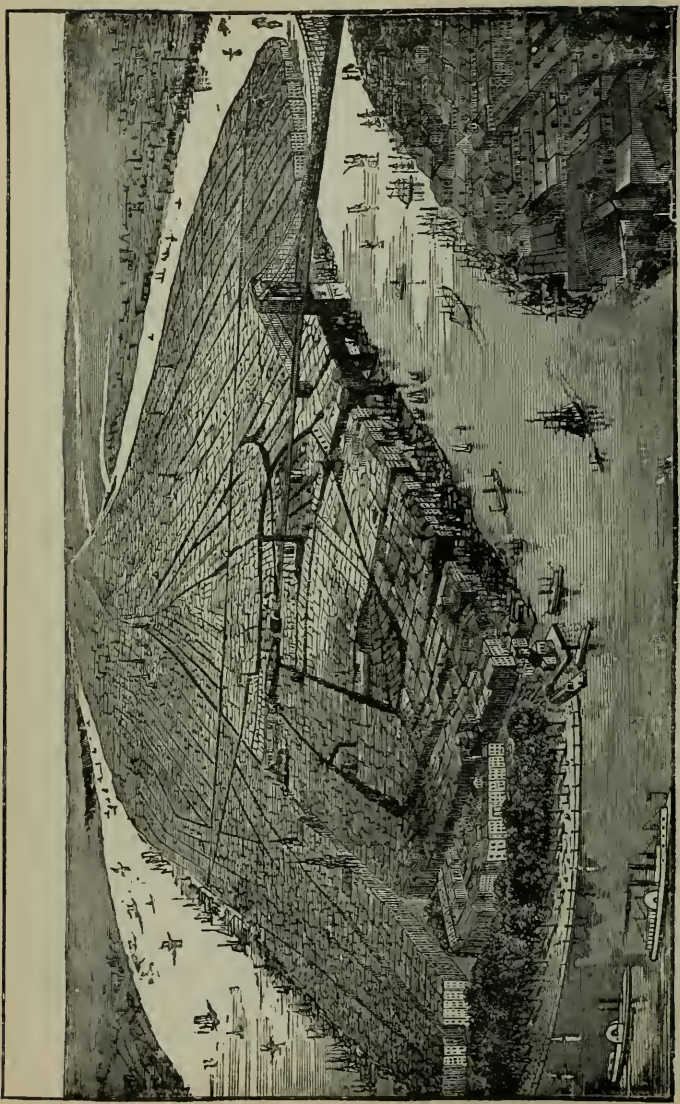
Russia stands in a very different position. In the first place, her home population eats rye, not wheaten bread. This implies that labour is much cheaper than in America, and that the wheat harvest is almost entirely devoted to export purposes, except in years when the rye harvest fails. We have also seen already that the average yield per acre is very low, which must be due either to bad cultivation or to an unfertile soil.

CHICAGO HARBOUR.

The latter is certainly not the cause, as the famous "Black Earth" plains between the Carpathians and the south of the Urals are extremely fertile, especially along the Don and the Dnieper; and there are good harbours at or near the mouths of both these rivers—Kherson and Odessa for the districts of Kiev and Bessarabia, and Rostov and Taganrog for the Cossack country.

Taking into consideration, then, the small yield per acre and the large amount exported, we may conclude that the **intelligence of the farmers** must be very low, and that the use of good machinery must be almost unknown, but that the area under cultivation must be very large. There seems to be no chance of much change for the better until there is a radical change in the system of holding land, and the expulsion of the Jews has terribly disturbed the transport organization; but, on the whole, we may expect the export of wheat from Russia to increase, and that from the United States—though not from Canada—to decrease.

India is much farther than either Russia or North America from the great European markets, and its land-rents are comparatively high; but it has some compensating advantages. It has a low plain of stony clay in the Punjab and the North-West Provinces, and a high plateau of rich "Black Earth" in the Central Provinces; the former area is far enough from the sea, and the latter is sufficiently sheltered by the Western Ghats, to have a dry climate; the irrigation facilities of the Indus and its tributaries, and the sticky soil of the Tapti basin, guarantee sufficient moisture; there is abundance of cheap transport by rail, river, and canal, especially since the completion of



NEW YORK.

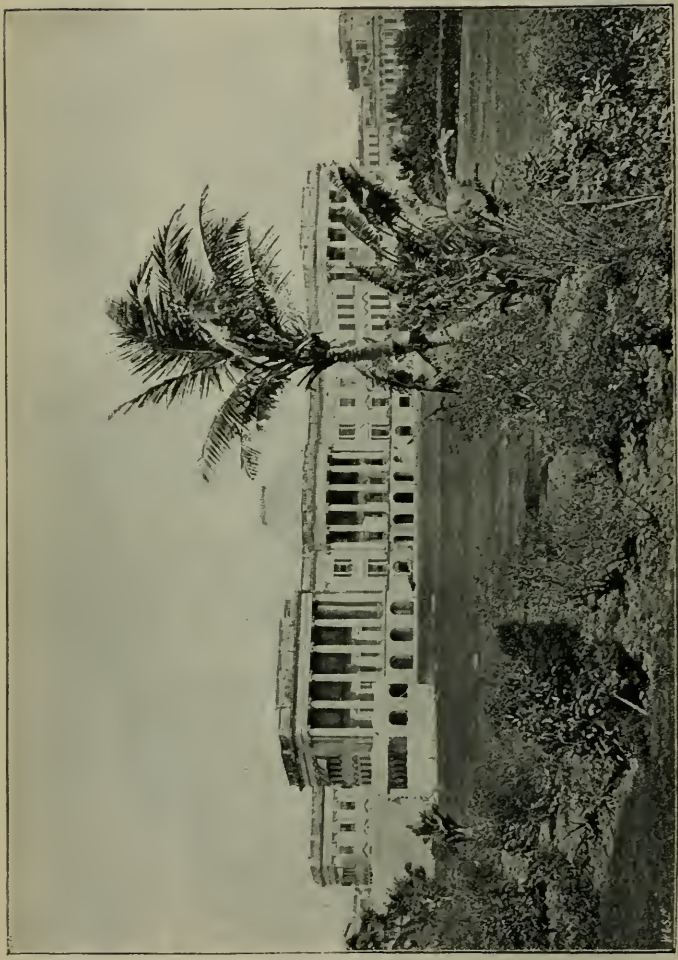
the direct line from Bombay to Calcutta *via* Nagpur and Raipur; and labour is exceedingly cheap.

The latter implies either a very dense population or a very low standard of comfort; and there are both in India. The food grains are rice and millet; and the population over the whole country averages at least 200 per square mile, compared with 50 in Russia and only 20 in the United States. From their position with regard both to the wheat districts and to Europe *via* the Suez Canal, Bombay and Karachi naturally do most of the export trade.

Among the **substitutes for wheaten bread,** we have already referred to rye, rice, and millet; and we may add maize, potatoes, pulses, and the banana.

The rye and potatoes can be grown on poor soils and in inclement climates, *e.g.* in Ireland, Russia, especially in Finland, and North Germany, especially in Posen, Pomerania, and East Prussia; and the fact that the potato is a native of the Chilian or Peruvian Andes illustrates how altitude affects climate in the same way as latitude does. The maize and rice require heat and moisture, the rice requiring much more of both than the maize. Consequently, while maize grows best in the continental climates of the temperate latitudes along the Dniester, the Lower Danube, the Plate, and the Mississippi-Missouri, rice grows best in the semi-marine climates of the tropical swamps along the Irawadi.

Two great **distinctions between maize and rice** are that maize is grown for beasts as well as for man, and for export as well as for home consumption; while rice is grown only for human food and almost entirely for domestic use in densely populated districts, *e.g.* the Yang-tsi-kiang basin. Indeed, the superiority



GOVERNMENT HOUSE, CALCUTTA.

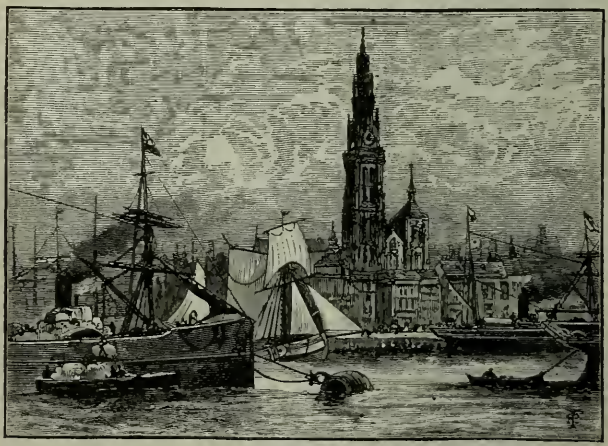
of Rangoon over Patna and other towns once famous for the export of rice is due to the unique combination in Lower Burmah of a large supply and a small population.

RANGOON.

All the greatest **centres for maize** are in the United States, *e.g.* Cincinnati, Indianapolis, Chicago, and St.

Louis ; and, in connection with their corn trade, all these cities have developed a very large pork trade. The same connection is found in Europe, especially along the Lower Danube, where the river is the only barrier between the beech forests of Servia and the maize fields of Wallachia and the Banat—from Widdin to Belgrade.

Millet and the soya-bean, the most important of the pulses, agree in liking a dry climate ; but, while millet



ANTWERP.

will grow on almost any soil, *e.g.* all over the thin province of Madras, the long root of the bean prefers the deep soil of an alluvial country like Egypt. Indeed, Egypt can also grow every grain that we have mentioned, and Egyptian wheat is so rich in starch that it is in special demand at Antwerp for distillery purposes ; but, of course, the area of the country is very limited.

The banana is both very nutritious and extremely prolific. It is said that 1 lb. of bananas contains more nutriment than 3 lbs. of meat, and that 4000 lbs. of bananas will grow on less space than 35 lbs. of wheat and 100 lbs. of potatoes. Moreover, it can be put to all sorts of other uses. For instance, in Uganda, under the Jesuit missionaries, it is converted into beer, brandy, champagne, vinegar, and jam ; the leaves are used to build and roof the houses, and bits of them do duty as plates, spoons, and bottles. A single leaf serves as an umbrella, a series of them as a lady's skirt or a baby's cradle.

FLESH AND FISH.

Of late years the whole system of **meat supply** in Europe has been revolutionized ; and the three main factors in this result have been the increase of population, the growth of towns, and the wonderful

MODERN TRANSPORT VESSEL.

improvements in transport. Since the Franco-Prussian war the population has increased by more than 60,000,000 ; and, though no other country approaches

the United Kingdom in the average amount of meat consumed by each individual, this has meant an increase of, perhaps, 50,000,000,000 lbs. a year in the demand for meat. The growth of towns has, at the same time, encroached considerably on the space available for pasture, especially in the British Isles and North-Western Europe. And the improvements in transport have been so great that cattle are now

LIVERPOOL HARBOUR.

brought alive from Brisbane to London : 90,000 carcases of New Zealand mutton can be carried by a single vessel in addition to her general cargo ; and 95,000 bushels of wheat have been shipped at Duluth —2000 miles up country from Halifax, N.S.—and unshipped at Liverpool.

The **great meat-exporting countries** are North America, Germany, the Plate region, Denmark, and New Zealand ; but the United States export twice as much as all the other countries combined.

The reason for this is mainly the existence of a **huge tract of rolling grass lands** west of the Mississippi—from Iowa to Texas, and from New Mexico to Missouri—which supports already 40,000,000 cattle, and which could support twice as many. A very large number of cattle are raised in Ohio, Indiana, Illinois, and Wisconsin, all of which States enjoy easy means of export by the Great Lakes ; and a still larger number of sheep are raised in the more mountainous States farther west—from Montana to New Mexico, and from Wyoming to Oregon. But the most important area, especially for cattle, is the rolling prairie between the Mississippi and the Rocky Mountains. There the air is clear and bracing, the ground is firm and dry, the water supply is unfailing, and the grass is rich.

Two grasses deserve special attention—"**Buffalo Grass**" and "**Bunch Grass.**" Both are very nourishing, being said to combine all the feeding qualities of grass and grain ; and both are converted into " hay " by the hot sun of July and August *without* being cut. This " hay " is left uncut throughout the winter, and the cattle can live on it even when there are several inches of snow on the ground. The great advantage of this is that the cattle get exercise in the fresh air in the depth of winter, even as far north as Calgary in Alberta. Of course, the atmosphere to the east, *i.e.* the landward side, of the Rockies is too dry for the snowfall to be very great.

In this region, then, we find every advantage that the **pastoral farmer** can ask for ; the grasses are very nutritious, the climate is magnificent both for man and for beast, the water supply sufficient, and the price of land very small. As soon, then, as the railway system was extended westward from Omaha, Kansas City, and

Dallas, the American farmer could compete successfully in foreign markets against the home farmer.

Germany, like the United States, exports its cattle from the warmer and more fertile part of the country, *i.e.* the sheltered highlands of Bavaria, Saxony, and Wurtemberg, and its sheep from the bleaker and less fertile parts, *i.e.* the lowlands of the Baltic provinces, Mecklenburg, Holstein, Oldenburg, and Hanover.

NÜRNBERG.

Germany, too, has at least as good railways and rivers as the United States, and much better canals and roads. Even in the south, where the natural barrier of mountains seems to have limited the industrial capacity of the people, Ulm, Ratisbon, Nürnberg, Augsburg, and Munich, are all important centres for the collection and distribution of agricultural products.

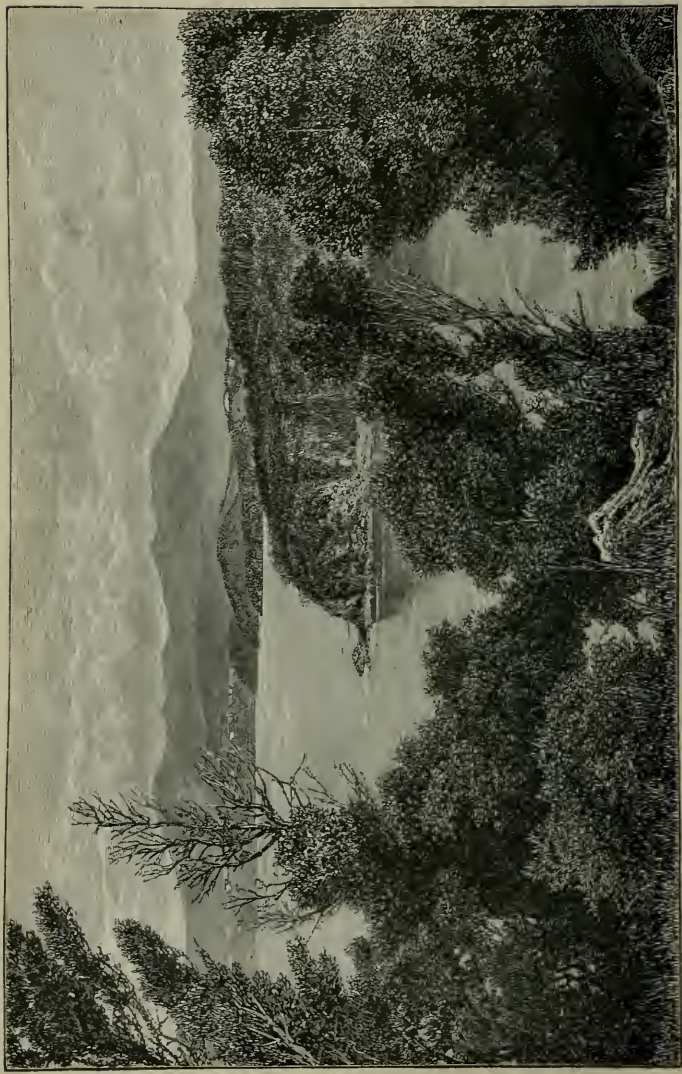
The Plate region includes both the Argentine and

PEAKS OF THE SOUTHERN ALPS, NEW ZEALAND.

Uruguay. The latter is better known than the former in this connection, probably owing to the ox tongues exported from Paysandu and to the Liebig's "Extract" works at Fray Bentos; but the Argentine possesses the better river harbours, *e.g.* Rosario and Buenos Aires, and Bahia Blanca is a much better deep-sea harbour than Monte Video. In many respects, however, what is said of the Argentine is true of Uruguay.

The Argentine is a land of medium temperature, where the soil produces naturally most nutritious grasses, especially for sheep; where the water supply is generally plentiful, and the rain is well distributed over the year; where there is no forest to clear away, and no "scrub" to dirty the wool; where labour is cheap, and transport very easy. Indeed, the land is so flat that in some places you can travel 200 or 300 miles by rail without seeing an embankment more than a yard high or a cutting more than a yard deep. The proximity to Europe gives the country also a great advantage over New Zealand.

On the other hand, the **New Zealand** farmer has the advantage so far as good farming is concerned. He has a much better breed of sheep; he takes care to give his stock some extra food in winter, so that he may produce an even, well-grown carcase; he has the carcases specially frozen for him after he has specially selected them, while the Argentine freezer is an independent speculator who buys any sheep that are in the market; and he utilizes every product of the animal, not only for economy, but also to ensure perfect sanitary conditions for the trade. Thus, within twenty-four hours of the slaughtering, the respective products are distributed to the various tallow and oil



OTAGO HARBOUR.

works, tanneries, sausage factories, fiddle-string makers, etc.; and all "waste" matter has been converted into an inoffensive form of manure to be sent back to the farms, there to perform its proper duty in the economy of nature by restoring to the soil some of the riches that have been drawn from it.

Even geographically the **New Zealand** farmer has a few advantages over the Argentine. For instance, the insular climate is very mild; the clearing of the "bush" originally by burning covered the soil of Auckland, Hawke's Bay, and Taranaki, with potash, which is an excellent top-dressing for grass; the volcanic formation in the same provinces is very healthy for stock to feed over, and will carry a large number of sheep per acre; the Southern Alps keep off the heavy rain from the Canterbury plain, while supplying it with countless streams of constant volume; all the chief ports, including the two artificial harbours of Oamaru and Timaru which export so much mutton, are on the sheltered side of the islands; and no country in the Southern Hemisphere contains four finer natural harbours than Auckland, Wellington, Port Lyttelton, and Otago.

The importance of farming in **Denmark** has already been noticed. The absence of minerals and the poor soil compelled the Danes to improve the productive power of their land; the marine climate favoured them, and their position favoured them still more. For Denmark is practically an island kingdom; it has only 50 miles of land boundary, and its peninsula is not nearly so important as its islands. The latter stretch completely across the entrance to the Baltic, and the commercial and strategic importance of this is enormous. Commercially, of course, the Little Belt

is more or less useless, as it is shallow and tortuous; and the Kiel Canal offers a quicker and safer route to the cattle port of Tönning. Moreover, the east coast of Jutland is practically entirely on the Kattegat, and has two useful little ports in Aalborg and Aarhuus.

On the other hand, the strategic importance of the Great Belt is enormous, because it is the only channel of the three which is deep enough for war-vessels,

THAMES SHIPPING.

though Denmark is not strong enough to use her position against Russia or Germany; and the **commercial importance of the Sound** is equally great. It is the shortest and the straightest channel, and is quite deep enough for all merchant vessels. Moreover, as it lies almost due north and south, sailing vessels can use the prevailing west wind both in entering and in leaving the Baltic. Indeed, the commercial importance of the passage may be gauged

from the size and name of Copenhagen—"the Merchants' Haven"—a city as large as Prague or Dublin even without its suburbs, and with them as large as Leeds or Cincinnati.

It stands partly on Zealand and partly on the much smaller island of Amager. It has splendid docks, very strong fortifications, and an approach from the east perfectly lighted from the rocky heights of Bornholm. It commands, therefore, the whole trade of the Baltic, which includes a very large export of cattle; and the construction of the **Kiel Canal** has only caused the Danes to improve their harbour without really endangering its commercial supremacy. The Canal route is, of course, much shorter than that round the Skaw, saving from 120 miles for a Hartlepool boat to 240 miles for a London boat. But the saving of time is not proportionately great, owing to the limit of speed on the canal; the canal route is obviously the more expensive; the approach to it in winter is made almost as dangerous by ice as the sea route is by storms; and Kiel does not occupy the exceptional position occupied by Copenhagen for attracting trade.

Denmark is, of course, very favourably situated also for **fishing** purposes; but in this respect, like her neighbours, she is completely outstripped by **Norway**. The barren soil, the abundant timber, especially round Fredrikstad, and the extraordinary coast-line of the "Land of the Midnight Sun," have driven the Norwegians into marine industries; and their supplies of ice, especially in the Skien fiord, and their proximity to the great banks of the North Sea, of which the Dogger is one, have given them special facilities for fishing and exporting fish.

The three most important species of **fish for food purposes,** are the cod, the herring, and the salmon; and Norway has a fishery in connection with each of the three. The salmon fishery is, of course, confined to the rivers and the shore waters; the cod and the herring are the product of the deep sea.

NORWEGIAN FIORD.

The cod periodically visit a submarine bank which juts out south-west of Tromso into deep water, and on which the Lofoten Islands stand. The water is very cold, for it is within the Arctic Circle; and the bank seems to be as rich as the Newfoundland or the Massachusetts bank, in the particular kinds of sea-weed amongst which the cod find their food. But the meeting of the cold Arctic air and water with the warm surface water of the Gulf Stream, and the persistent warm winds which beat up against these islands from the south-west, cause dense fogs and severe storms, which make the Mälstrom part of the bank very dangerous. And the danger is increased

by the fact that the fishing does not begin till December, and that the western shores of the islands are very shallow, badly supplied with harbours, and

THE FLOOR OF THE NORTH SEA.

exposed to the full fury of wind and wave. Subsequently, however, about the middle of January, the

fish move round to the eastern and more sheltered side of the islands.

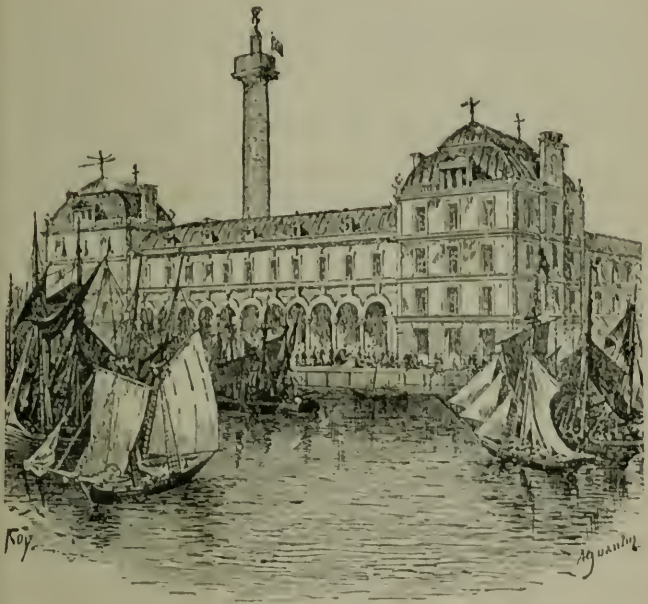
The cod are either split and dried on "stakes," from which they get their market title of "stock-fish," or salted and dried on the "cliffs" behind the fishermen's huts, from which they get their market title of "klippfish"; and there is a very important oil industry in connection with the fishery. Only the finest quality of oil, *i.e.* that used for medicine, is really profitable, train oil being a drug in the market.

The herring do not go as far north as the cod, because in the colder water they do not seem able to find suitable food. They are generally found in the deep submarine channel which cuts off the Stavanger and Hardanger banks from the floor of the North Sea; and, therefore, Bergen practically monopolizes the fishery. There is a spring as well as an autumn season, but the spring fish are very much thinner and fewer than those caught at the end of summer.

Norway possesses the **three great qualifications for a fishing centre**. Her fishing grounds are very prolific, they are very near to her fishermen's homes, and there are convenient markets—in the string of large cities which fringe the western and southern waters of the North Sea—centres at once of an enormous population demanding food and of an extremely wealthy minority demanding luxuries. For Billingsgate is the largest fish market in the world, and Dunkirk supplies fish to a nation famous for the milliner and the man-cook.

The fisheries which are mainly concerned with the supply of **luxuries** are, however, comparatively unimportant otherwise; and they often ought not to be classed as real fisheries at all. For instance, the amber,

the coral, the pearl, and the tortoise-shell "fisheries" are entirely unproductive from the economic point of view; and, though they naturally employ a certain amount of labour at such centres as Dantzig, Carloforte or Cagliari, Ceylon or Bahrein, Belize or Traxillo, the same labour might be employed much more usefully in some other way.



BILLINGSGATE MARKET.

With the real **food fisheries** the case is very different. In the first place, they are the only satisfactory school for a navy, whether Royal or mercantile. The heroes of the Armada hailed from Devonshire and Cornwall; and to-day Plymouth and Devonport are famous as naval stations, St. Ives and Penzance as pilchard and

mackerel ports. The same is true of France. Brittany resembles the Cornish peninsula, not only in outward appearance, but also in its situation far from centres of agriculture, mining, and manufacture. The sardine of Douarnenez and Concarneau is such a close relation to the pilchard that the latter often takes its place in "sardine"-tins; and Lorient and Brest are naval stations—the Plymouth and Portsmouth of France.

In connection with this important question of defence, there are the questions of labour and of food. The amount of **labour** that a food fishery employs may be gauged from the fact that the three provinces of Nova Scotia, New Brunswick, and Quebec, employ 50,000 men in the cod fishery alone ; and, of course, such a marine reserve would be invaluable in times of national danger. That the Canadians appreciate this is proved by the fact that, like the French, they expend a very large sum every year in bounties to their fishermen.

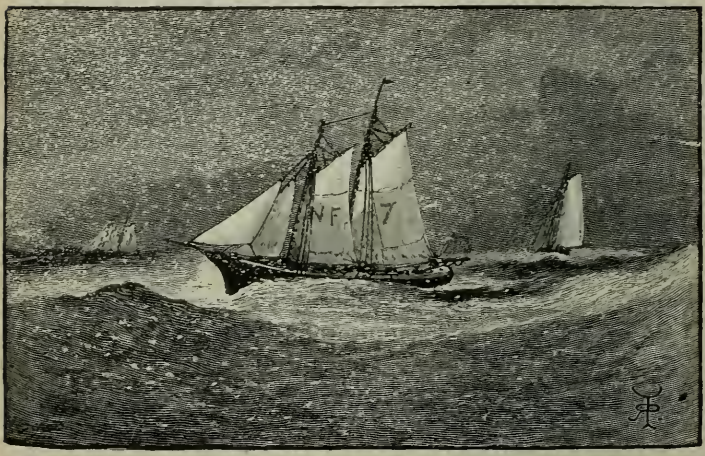
The amount of **food** which even a comparatively poor fishery can supply, may be gauged from the fact that whole populations, *e.g.* in Cape Colony or along the shore of the Okhotsk Sea, live on fish. This is accentuated where a hot climate or the creed of the Roman Church makes fish a virtual necessity. For instance, in Mauritius thousands of pounds' worth of fish are imported from Simon's Town and other fishing stations on the South African coast ; and in Barbados the negroes, besides being compelled to work by the difficulty of obtaining food in such a densely peopled island, are compelled to accept even the cuttle-fish as a dainty. So, too, in the Romanist countries of Southern Europe there is as constant a demand for cod from the Dogger or Newfoundland as there is for cinnamon (for incense) from Ceylon and the Malabar coast.

There are **three great fishing centres** in the world at present. One is, of course, the North Sea, from which fish to the value of £4,500,000 a year comes into Great Britain alone, mainly through the Scotch ports of Wick and Peterhead, and through the English ports of London, Grimsby, Hull, Lowestoft, and Yarmouth. All the other countries round the sea are more or less engaged in its fishing industries, though not to the same extent as Norway; and, where any individual fishery has become famous, it is usually of a kind which does not compete with the Norwegian products. For instance, the low, muddy coast of Holland is admirably suited to the oyster; and this, like the sturgeon of the Volga, is more a luxury than a food fish. The sturgeon, however, if really less nutritious than the oyster, is much more in demand as an ordinary food; and the fishery would be, and was for many years, carried on quite apart from its connection with the demand for isinglass and caviare. Indeed, Astrakhan is one of the greatest fish markets in the world, distributing its produce in every direction—up the Volga to Nijni-Novgorod, by rail from Tsaritsin to Kiev, and across the Caspian Sea to Baku. The railway service is, unfortunately, totally inadequate for the distribution of fresh fish; but the salt lakes of Elton and Baskountchak supply abundance of material for pickling purposes.

The other two centres are the north-west corner of the North Atlantic and the north-west corner of the North Pacific, for in both these places, as in the North Sea, there are large submarine banks on which the fish can find their natural food and suitable spawning-grounds.

The banks in the **North Atlantic** stretch from Cape

Race to Cape Hatteras, but the Newfoundland Bank is the most prolific part of them. This bank is chiefly due to the melting of icebergs brought down by the cold waters of the Labrador Stream into the warm waters of the Gulf Stream, and to the consequent precipitation of the soil that all icebergs carry with them



WINTER FISHING OFF NEWFOUNDLAND.

from the coast against which they were built up. The coldness of the water along and north of the banks suits the cod better than the herring; and St. John's is, therefore, the great centre of the cod fishery. But west of the banks there is also a herring fishery, even in winter, especially between the French island of Miquelon and the shores of Fortune Bay. Sometimes a trench is actually cut through the ice, through which the nets are lowered and the catch is hung up in the wind to freeze!

The herring, however, prefer the waters farther

south, especially the submarine channel between Cape Sable and Cape Cod. The chief ports are St. John on the Bay of Fundy, Portland in Maine, and Plymouth in Massachusetts; and the fishery in the Bay of Fundy is particularly interesting. There, owing to the height and pace of the tide, the fishing is mainly done by drift-nets, the boats drifting for miles on the fastest and highest tide in the world. In

STEAM TRAWLER.

some places, where the floor of the bay is very smooth, fir-trees are placed in rows on the bare rocks at low water with stones upon their roots; and then the nets are stretched from tree to tree.

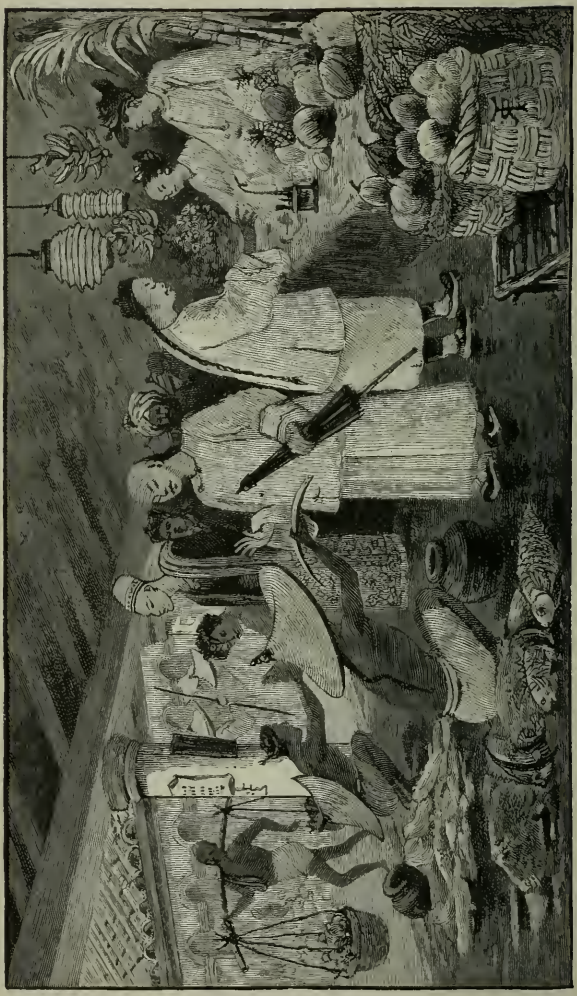
There are also very large sea and river fisheries in both the Canadian and the New England waters, for mackerel and lobsters, salmon and shad, and oysters.

ON THE FRASER RIVER, BRITISH COLUMBIA.

The Oyster thrives specially well in the sheltered water of Chesapeake Bay. There the Susquehanna and the Potomac provide both the percentage of fresh water which is so desirable and even necessary, and the alluvial mud in which the molluscs can burrow for food; the Delaware peninsula protects the spot from the violence of the Atlantic; and Baltimore and Norfolk are excellent centres for export. The thousands of hands that are employed in these towns during the winter and early spring in canning the oysters, can obtain work in the summer and autumn in canning the fruit and vegetables of Maryland and Virginia; and the oysters can compete in quality with those of Whitstable and Colchester, of Arcachon and Brittany, of Ostend and Texel.

The shad and the salmon are river fisheries, the former in the United States and the latter in the Dominion; and they illustrate excellently the modern method of conducting a fishery.

A few years ago the **distribution of fish** was confined more or less to the neighbourhood of fishing ports and villages; but, with the wonderful improvements in transport, all this has been changed. Fish landed in Aberdeen to-day may be had in Birmingham to-morrow, and Liverpool may have fish from the Bay of Biscay or the Faroe Isles. This capacity for unlimited distribution, the employment of steam in the fishing vessels, the increase of population, and the more than proportionate increase recently in the use of fish as food, have revolutionized the whole industry. More men and larger boats are employed; lines have been lengthened, and nets widened; the movements of fish are watched, and telegraphed to important fleets; fresh fields have been sought; and the most stringent



CHINESE FISH MARKET IN SINGAPORE.

regulations have been made—in France, Belgium, Denmark, Italy, Holland, and Prussia—against selling undersized fish. Still the supply diminishes.

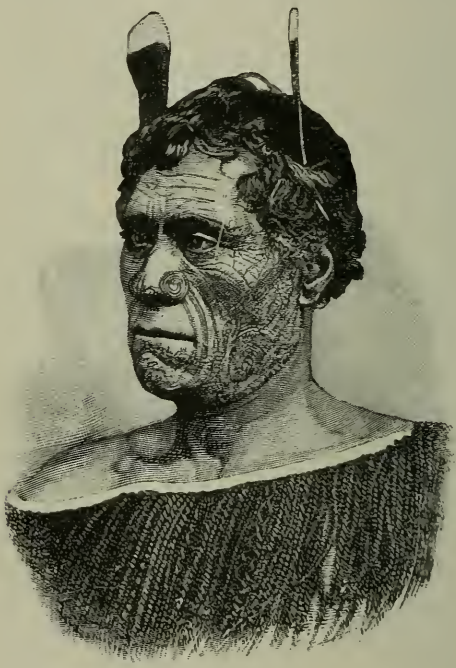
The New World has come to the rescue with an entirely successful scheme for the **artificial propagation** of immense numbers of food fishes. In the United States £70,000 a year has been spent in distributing and hatching about 400,000,000 eggs; and it was by this method that the shad was transferred from Long Island Sound to the Sacramento, and thus spread from the Golden Gate of California to Vancouver and Olympia.

The west coast fishery is, however, mainly **salmon** —on the Fraser and the Columbia rivers; and Esquimalt, the port of Victoria, is the most important centre. It can command the import of tin and Chinamen from the Malay Peninsula for the canning trade of Astoria and New Westminster, and thus has come to control the export of the salmon. The water of these rivers is so clear, after coming from glaciers through lakes, that almost all the fishing has to be done by the wily Indian and at night, though the fish are so numerous that "you can walk across the Fraser on their backs!"

An equally striking story, which has the additional advantage of being true, is connected with the oolachan fish, which frequents the Fraser. It is so full of oil that, if you fix a dried one into the neck of a bottle and light its tail, it will burn like a candle.

This Canadian fishery is considerably farther north than that in the north-west corner of **the Pacific**, The latter extends over the shallow waters west, south, and east of the Corea, and up the rivers which empty into the Yellow Sea; and its importance is

due to the enormous amount of fish that is eaten by the Chinese and the Japanese. The Japanese eat ninety different kinds of fish, the inhabitants of Yesso even using the flesh of stranded whales; and it is said that 40,000,000 Chinamen make their living by fishing



MAORI.

—with every kind of line and net and boat, by day and by night, and with every imaginable device and decoy, animate and inanimate.

The Chinese also import a large quantity of fish, mainly from **tropical waters.** The general idea that fish caught in tropical waters are unwholesome, is

quite erroneous; but the colder water does produce the more valuable food fishes. For instance, the catch of Frankston and Hastings and other Victorian ports is better than that of Port Darwin and Cooktown. The two latter places share, with such places as New Caledonia and Tahiti, in the export of trepangs to China, where that unsightly sea-slug is considered such a delicacy that it brings the Macassar importers £100 a ton.

The **Shark fishery** of New Zealand is another of somewhat the same kind; but the shark is certainly not caught, as the trepang is, by wading over mud banks at low water and groping in the sand with your bare toes! And the fishery is interesting also because of its economic conditions, for—as with the mutton (cf. p. 89)—nothing is wasted. The best parts of the flesh are used by the Maori fishermen for food; the liver yields a valuable oil; the fins are exported to the Celestial soup-kitchen, there to compete with fins from Akyab, Sumatra, the Sandwich Islands, and other places; the skins make shagreen leather; and the refuse forms a good manure for vegetables and fruit-trees, *e.g.* the peaches of Nelson.

COAL AND IRON.

Mining, like agriculture, depends on geological formation, but less obviously; and there is much difference between mineral and agricultural products.

In the first place, the latter depend on very **evident present conditions**, such as the surface soil, the sun's heat, and the rainfall, all of which can be easily ascertained; but mineral products are generally far beneath the surface of the earth, and are the result of more or less undetermined past conditions.

In the second place, minerals are a **strictly limited natural monopoly**. If our supply of hennequin from Yucatan and British Honduras is insufficient, we can grow more in the same or in similar places; but, if the Californian mercury mines fail, we cannot create new ones, nor can we make more productive the old mines at Almaden and Idria.

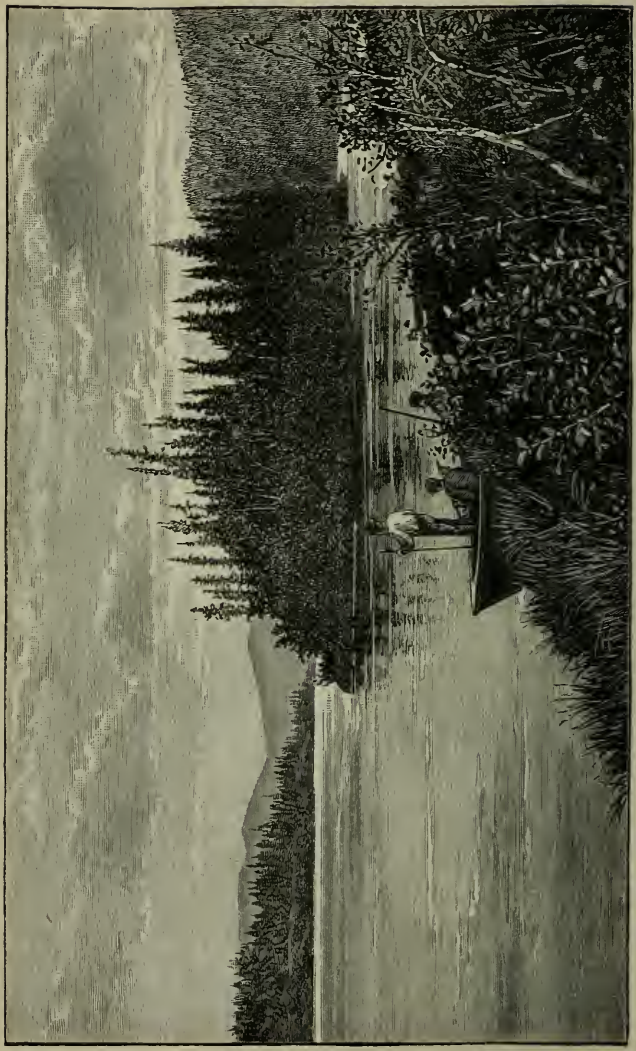
We have said that minerals are not dependent on climate. Of course, the **climatic conditions** under which certain minerals have to be worked, may encourage or retard the working of them. For instance, the elevation enables trained European miners to be employed in the tin mines of Tenterfield and other places on the Great Dividing range in New South

Vales, as in the coal quarries of Molteno and other laces on the Storm-berge range in Cape Colony. On ne other hand, the damp heat of tropical islands ecessitates the employment of coloured labour, Chinese r Melanesian, in the tin mines of Banka and Billiton ; nd the arctic climate of Alaska greatly impedes old-mining along the Yukon river. But, except in nis respect, climate has little or no effect on ninerals ; and, therefore, they have to be worked vhere they are found, and cannot be "transplanted" o some more suitable situation.

This accounts for the saying that "**minerals attract ther things,**" which is most true of coal, the most aluable of all minerals. Thus, the salt of Cheshire has ttracted chemical works to Widnes and St. Helens ; nd these works have attracted other industries which equire chemicals, *e.g.* soap and glass. At the same ime, the salt industry itself depends on the coal-fields f Cheshire and South Lancashire. So, the coal-fields f Pennsylvania have attracted to Pittsburg the iron nd copper of Michigan, the glass-sand of Missouri nd Illinois, the lead of Wisconsin, and the tin of Dakota.

This attraction of industries involves, of course, an **ttraction of population,** which has been most marked n England. Thus, towns like Birmingham, Leeds, nd Sheffield, have taken the place of towns like Canterbury, Salisbury, and Winchester ; and this can carcely be explained except by the presence of coal in he one case and its absence in the other.

The **importance of coal** is obviously due to its value or motive power. In primitive times or places animal abour may provide this, *e.g.* for threshing and grinding orn ; and wind-mills may be employed even in fully



ALONG THE YUKON RIVER.

civilized countries, *e.g.* Holland, where there is no coal, and where there are steady breezes blowing over flat land. But it is to coal that we owe the extraordinary progress, especially in mechanical invention, of the last half century. It has been calculated that, taking the steam power of 10 lbs. of coal as equivalent to the manual labour of one man for one day, the coal supply of the United Kingdom alone represents the work of

IN HOLLAND.

140,000,000 men every year. It becomes necessary, therefore, to examine the position and character of the chief coal areas of the world.

The great **coal-producing era** was a fairly definite period in the early geological history of the earth, when the unchanging "tropical" heat, the excessive moisture, and the abundance of carbonic acid, combined to produce a most luxuriant vegetation. These favourable atmospheric conditions were not sufficient

by themselves to develop *real* coal. The physical formation of the area and the character of the rock were also extremely important. The area had to be of such a shape as would retain water in shallow basins ; and the rock had to be of a kind, *e.g.* limestone or millstone grit, which, in the presence of the water and of internal heat, would generate the hydro-carbons of our real coal.

Real coal is of two main kinds, anthracite and bituminous ; and of the two the latter is the more important. The difference between them is simply the proportion of carbon to gas and tar. Bituminous coal has a considerable amount of these flame-producing elements, and is therefore easy to light ; anthracite contains much less of them, and is therefore hard to light. At the same time, when once thoroughly lighted, anthracite burns with a very intense heat and with very little smoke ; and this makes it particularly useful in such industries as iron-smelting and brewing.

The total **coal-production of the world** is about 500,000,000 tons a year, of which the British Empire produces about 200,000,000, the United States about 170,000,000, and Germany about 75,000,000. France, which comes next in order, produces only one-third of the amount produced by Germany ; and Belgium, which produces scarcely 20,000,000, is yet twice as productive as Austria-Hungary, which stands sixth on the list.

These figures are unimportant in themselves, but they throw considerable light on the cost and the average consumption of coal in the various coal-producing countries.

As might be expected, the **average consumption** is greatest where railways and manufactures are most

fully developed, *i.e.* in Great Britain and the United States ; and this accounts for the fact that the average consumption in Belgium is far greater than that in either Germany or France. For the two latter countries are still largely agricultural. The French average is reduced, however, owing to a large consumption of wood, peat, and lignite, in small industries as well as for domestic purposes, in order to economize the very limited supplies of coal.

The **cost of the coal** at the pit mouth, whether measured in men or in money, varies greatly. The United Kingdom employs about 650,000 people, while the United States employs only 350,000 ; and yet the latter produces very nearly as much coal as the former, and at a considerably lower average price—5s. 4d. a ton instead of 6s. 9d.

This means that **the conditions** under which the coal is raised in the two countries must be very different. In the United Kingdom, as in Europe generally, the seams of coal are numerous, but thin ; in the States they are less numerous, but very much thicker. For instance, many of the seams at Liège or Mons or Namur are so thin and so hard to get at, that they would not be worked at all in America ; but, as the price per ton in Belgium is about 7s. 6d., and as labour there is cheap, it pays the Belgians to work them.

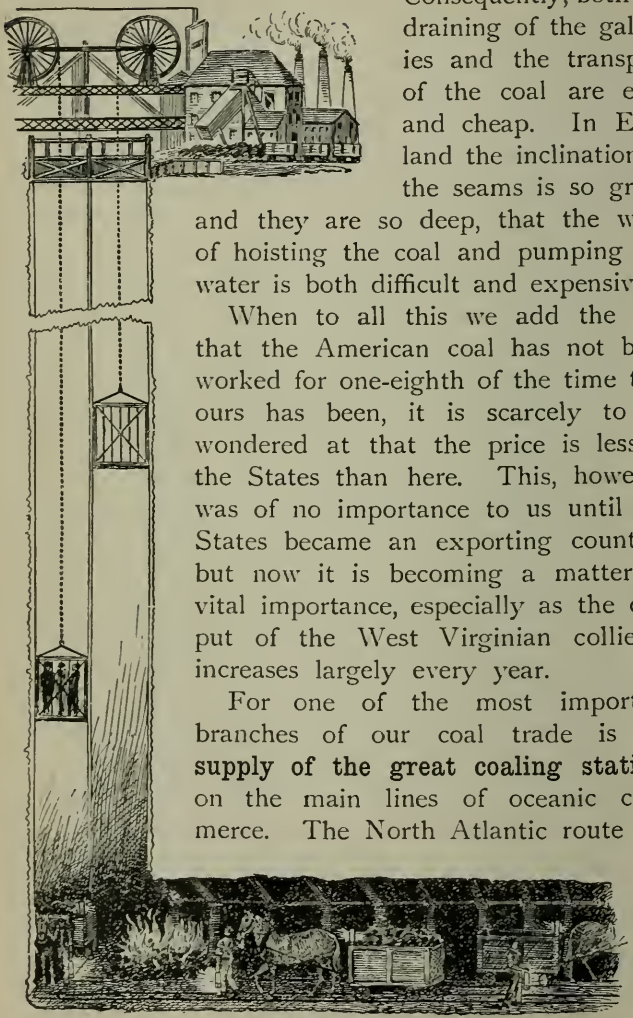
In Europe, again, **the coal-fields** are small and scattered ; in the States they are large and concentrated. Thus, it has been calculated that in the coal areas Europe has not much more than 1 square mile of available coal for every 200 square miles of surface, whereas the States has 1 for every 20.

Moreover, with the exception of the anthracite deposits, the **American seams** are more or less

uniformly horizontal and usually above water-level. Consequently, both the draining of the galleries and the transport of the coal are easy and cheap. In England the inclination of the seams is so great, and they are so deep, that the work of hoisting the coal and pumping out water is both difficult and expensive.

When to all this we add the fact that the American coal has not been worked for one-eighth of the time that ours has been, it is scarcely to be wondered at that the price is less in the States than here. This, however, was of no importance to us until the States became an exporting country; but now it is becoming a matter of vital importance, especially as the output of the West Virginian collieries increases largely every year.

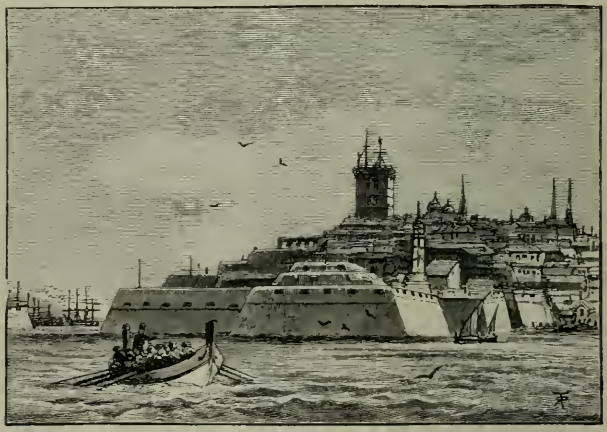
For one of the most important branches of our coal trade is the **supply of the great coaling stations** on the main lines of oceanic commerce. The North Atlantic route has



ENGLISH COALSHAFT.

HALIFAX, N.S.

such abundance of coal in Lancashire and Nova Scotia to supply the great termini of Liverpool and Halifax, and is comparatively so short, that it does not need such stations; and, even if it did, there are none in the North Atlantic. The Cape Horn route is almost in the same position. Rio de Janeiro and Monte Video are convenient ports of call, and the Falkland Islands afford a post of vantage; but, considering the bad weather of the Horn route, the supply of coaling stations for a Chile-bound vessel is singularly deficient.



MALTA.

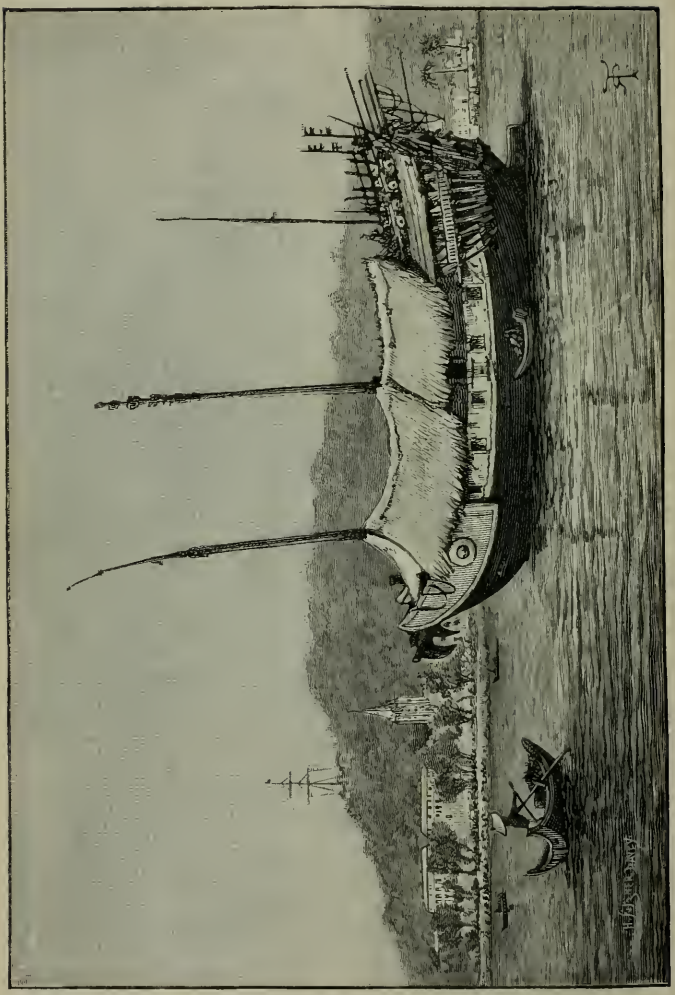
The **three other great trade routes**—the Suez, the Cape, and the West Indian—have many stations. On the Suez route there are Gibraltar, Algiers, Malta, Perim, Aden, and Point de Galle; on the Cape route there are St. Michael, Madeira, Teneriffe, St. Vincent, Ascension, and St. Helena; and on the West Indian route there are St. Thomas, San Fernando, Port Castries, Kingston, Nassau, and the Bermudas.

Now, hitherto there have been only **three coal-exporting countries**—Great Britain, Germany, and Belgium; and Great Britain has exported more than twice as much as both the others together. The entry of the States into the export market has been marked by a greatly decreased demand for Welsh

KINGSTON, JAMAICA.

and English coal along the east coast of South America. And there is every probability of West Virginia becoming at no distant date the great rival of Cardiff and the Tyne ports in the Atlantic.

The States is not our only rival. In the Far East we have to reckon with New South Wales, New Zealand, Formosa, Japan, and Chile; in South Africa, with the excellent "bunker" coal of Natal and the enormous inland deposits of the Transvaal; in India, with the mines of Assam and Bengal. For instance, the New South Wales coal is shipped regularly to



SINGAPORE.

Ceylon, Burmah, China, the Straits Settlements, Singapore, the Western States of the Union, and the islands of the Pacific; the Assam and Bengal coal has displaced British coal in the east of India, and new mines are being rapidly developed in Madras and Haidarabad.

In one sphere, however, we are free from any formidable rivalry; and that is in the **combined production of coal and iron.** Iron is found in almost every part of the world; but the transport of such a heavy article is so expensive that it has little commercial value unless it is found in close connection with both coal and limestone. On the other hand, the possession of these three in proximity to one another forms the basis of manufactures and of transport both by land and by sea. Thus, the three great coal-producing countries are also the chief producers of iron, and have the largest transport and manufacturing industries in the world. Shipbuilding has made most progress in the United Kingdom, railway construction in the States, and manufactures in Germany. All the three countries have to import large quantities of iron to enable them to keep pace with the demands of their trade; and, in the case of the United Kingdom and Germany, the trade is largely a foreign one, in which Belgium is their greatest rival.

Another fact that will be brought into prominence by a more detailed examination of the great coal and iron areas is, that they must be **easily accessible by water.** The most famous coal-field is that in Durham and Northumberland, which has given the name of Newcastle to coal towns in all parts of the world, *e.g.* in New South Wales, New Zealand, and Natal; and it illustrates forcibly the point at issue.

It extends along **both banks of the Tyne,** and the coal lies actually along the river. On the north bank stand Newcastle itself, North Shields, and Tynemouth; on the south bank stand Gateshead, South Shields, and Jarrow. And it is to the ease with which the coal can be worked and shipped, that the Tyne ports owe their fame. They still export more coal than any other centre except Cardiff; and, in connection

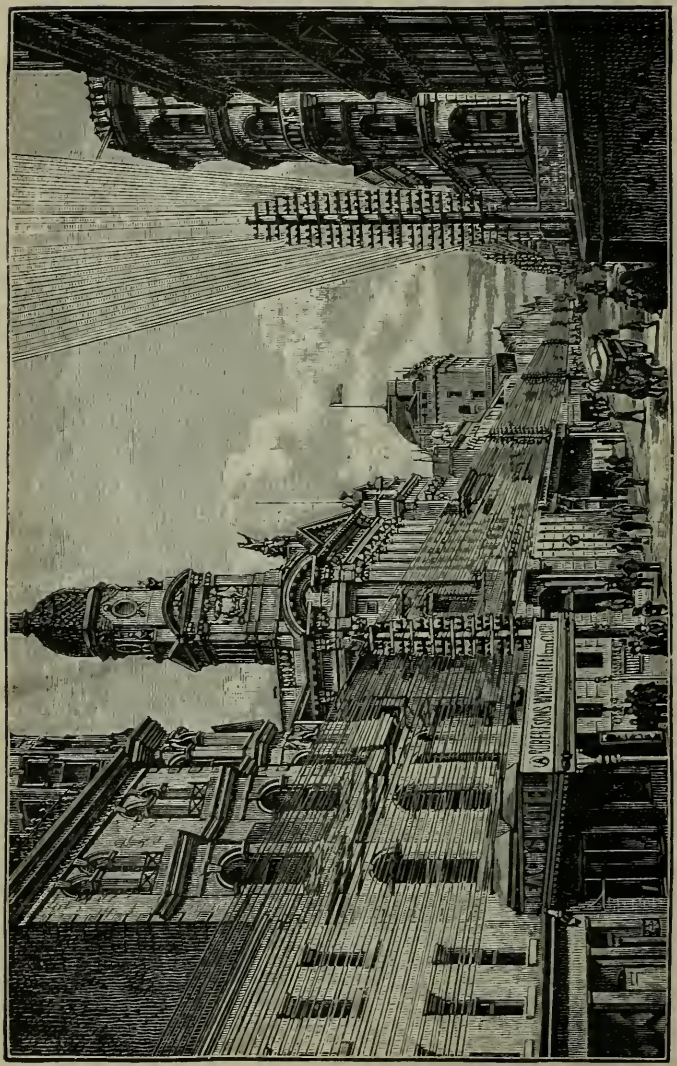
CAMPANIA (CUNARDER).

with the neighbouring Cleveland iron-field, their coal trade has given rise to the large shipbuilding industries on the Tyne, the Wear, and the Tees, as the coal of Whitehaven and the iron of Furness have to the shipbuilding of Barrow. A large proportion of the coal is now used in the ironworks and shipyards of Newcastle, Sunderland, and Middlesborough; and, in connection with the shipping, a rope and sail industry has sprung up at Hartlepool. The coal and

the shipping combined have also attracted an enormous trade in chemicals and glass.

The great **Lancashire and Yorkshire,** or "cotton and woollen" field, though less known as an exporter, also owes its importance to its waterways—the Mersey and the Humber. The coal lies along both sides of the Pennine range; and, as that range is much nearer to the west coast than to the east, the western coal area can ship its product much the more cheaply. This fact, coupled with the convenient position of Liverpool with regard to the United States, drew the cotton trade to South Lancashire, while the woollen trade, which depended at first on home supplies of wool, naturally preferred the neighbourhood of the Yorkshire moors. In connection with the huge population behind it, Liverpool almost monopolizes the American grain and cattle trades as well as the cotton; Widnes has the chief copper-smelting works in England; and St. Helens shares with Newcastle the glass and chemical trades of the country. The relation of the iron trade to coal is also illustrated in Yorkshire by the prosperity of Sheffield.

The same predominating influence of waterways is found in **South Wales.** There, as the counties of Glamorgan and Monmouth contain valuable deposits of anthracite, Cardiff, Newport, and Swansea, have special advantages. Cardiff exports more coal and more tin-plate than any other port in the world, and draws much of its tin from Devonshire and Cornwall. Swansea has the largest copper-smelting industry in the country, and Merthyr-Tydvil has very large steel works; and almost all the copper and the iron ore come from Spain—the copper from Huelva and the iron from Bilbao.

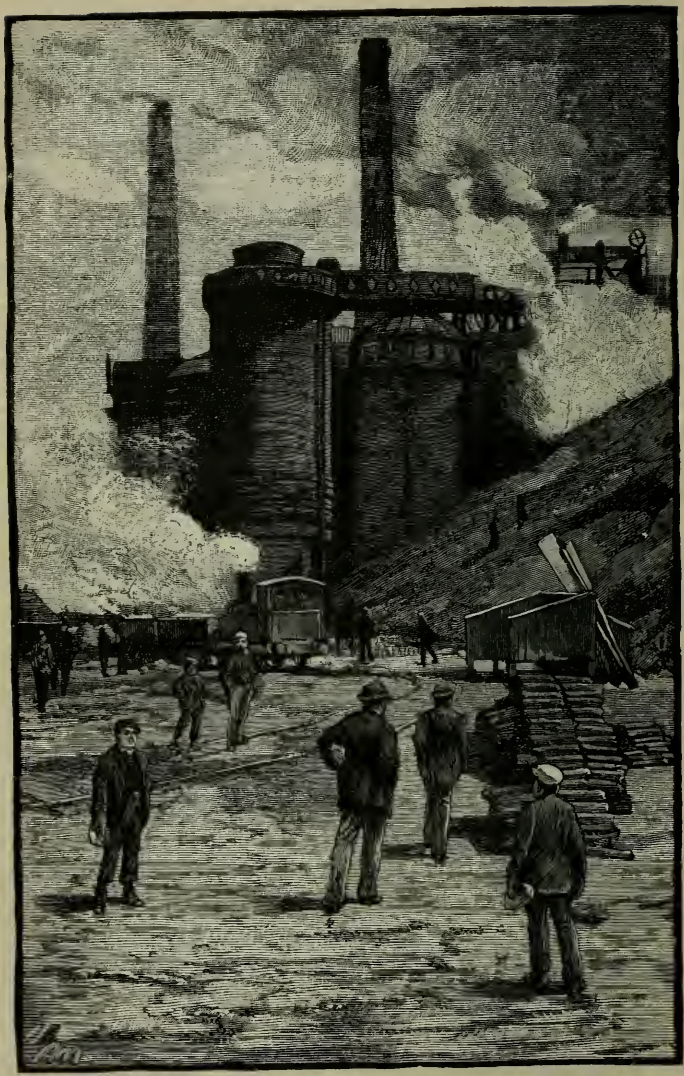


SYDNEY, N.S.W.

So, too, in other parts of the **British Empire.** The Nova Scotian sea-side collieries of Sydney, Pictou, and Springhill, have been developed side by side with the iron of New Glasgow, Truro, and Londonderry. The British Columbian and Australasian coal is less fully developed, but it has in each case every advantage that position can give. The Vancouver mines at Comox and Nanaimo have perfect facilities for shipping, and are close to a mountain of magnetic iron ore in the island of Texada; the New Zealand mines at Greymouth and Westport are also on the coast, and close to the iron-sand of Taranaki; the rich New South Wales centres of Newcastle and Wollongong are on tidal rivers, the Hunter and the Nepean, and close to Sydney.

Where a coal and iron field has no natural waterways, artificial ones must be provided. Thus, the Warwickshire and Staffordshire, or "**Black Country and Potteries**" field, is completely inland; but, as it lies between the Severn and the Trent, and is the nearest coal-field to London, it has been provided with better canal accommodation than any other coal-field in the country. Consequently, it can bring to Stoke and other "Pottery" towns supplies of china clay from the decayed granites of Devonshire and Cornwall, and can bring Swedish iron to the pen factories of Birmingham, the needle shops of Redditch, the bicycle works of Coventry, and the forges of Wolverhampton, West Bromwich, and Walsall.

The **Scottish coal-fields** lie in the narrowest and lowest part of the country, and thus have exceptional facilities for distribution by sea, rail, and canal. In the west the coal lies partly along the Ayrshire coast from Troon to Ardrossan, and partly along the



IRONWORKS.

Clyde; in the east it lies along the two banks of the Forth.

The Ayrshire portion feeds the ironworks and woollen factories of Kilmarnock and the shipyards and linen factories of Belfast. The Clyde portion has made **Glasgow** the commercial capital of Scotland, the second city in the United Kingdom in actual numbers, and the second city in the Empire in importance. Besides the coal and iron of the suburban towns, *e.g.* Airdrie, Hamilton, Coatbridge, Wishaw, and Motherwell—it collects for export the linen of Johnstone, the silk and muslin of Renfrew, and the thread and shawls of Paisley. It has also very large copper-smelting and engineering works, and shares with Greenock and Dumbarton in a most important shipbuilding industry. The eastern seams are richest round Bathgate; they feed the ironworks of Falkirk and the linen factories of Dunfermline, and the surplus is exported from Grangemouth, Burntisland, and Kirkcaldy, to places like Dundee, Arbroath, and Aberdeen.

In the **United States** there are two fields of true coal, the Alleghany field being by far the more important. It takes its name from the Alleghany Mountains, which run from north to south throughout its entire eastern portion; and its area is about that of England and Wales. The coals of this area are of three kinds. To the west of the range they are bituminous, to the east anthracite, and between the two semi-bituminous.

The **anthracite** area is comparatively very small, being not larger than Bedfordshire or Berwickshire; but it is extremely valuable, and has entirely moulded the development of Philadelphia. It is divided into

three parts—the southern, the central, and the northern. The latter is the largest of the three; it lies along the Susquehanna between Scranton and Wilkesbarre, but generally takes its name from the little historic town of Wyoming. The middle part lies along the Lehigh, which is a tributary of the Delaware, and has its centre at Manch Chunk. The southern takes its name from the Schuylkill river; and, though its nominal centre is Pottsville, it owes its supreme importance to its nearness to Philadelphia, which stands at the confluence of the Schuylkill and the Delaware.

The **semi-bituminous**, though only a small field, is very useful, because the coal both produces great heat and contains also sufficient bitumen to make a blaze. This makes it so valuable for generating steam —the flames spreading through the boiler tubes—that it is often called simply "steam" coal. The field lies partly along the head waters of the Juniata and the Alleghany, but its centre is at Cumberland on the Potomac.

The **bituminous or "gas" coal** is found along the west of the whole Alleghany range—from Pittsburg to Birmingham. The richest part of this area is the Monongahela valley, though the Alabama towns on it have been making extraordinary progress of late. Wheeling and Connellsville share with Pittsburg in the huge trade of the valley, Connellsville being specially famous for its coke. The field extends from Pittsburg north-west as far as Youngstown, south-west as far as Portsmouth and Ironton, and due west as far as Newark; and, as all the richest deposits lie close to the Ohio, transport is easy and cheap.

The **central coal-field** is very much less valuable than this eastern or Alleghany field, and is mainly

confined to the west of Indiana. It has, however, one peculiarity, *i.e.* "block" coal. This name has been given to the coal by the miners because it is found in the mine in cubic blocks, two or three feet long by twelve or eighteen inches wide. The blocks retain their shape in smelting to such an extent that the blast and the flame can easily penetrate the mixed mass of fuel, ore, and flux; and, therefore, the coal

OIL TRAIN AT THE WELLS.

has a unique value in the iron trade. The centre of the field is near Terre Haute, where the railway from Indianapolis to St. Louis crosses the Wabash river.

There is abundance of good **iron ore** in both these areas, especially along the Ohio between Marietta and Ironton; but the chief supplies of iron come from Port Marquette. In that part of Michigan there is neither coal nor limestone; but the deposits are so wonder-

BOSTON, U.S.A.

fully rich and accessible, and transport *via* the Great Lakes is so easy and cheap, that enormous quantities of the ore are sent to the twin cities of Pittsburg and Alleghany *via* the Lake Erie ports of Esconaba and Ashland.

Almost the whole of the Alleghany region is on excellent limestone, so that flux can easily be obtained everywhere; and the soil is very fertile. Moreover, throughout the bituminous strata there are immense reservoirs of **oil and natural gas**. The oil is most abundant along the lake, *e.g.* round Toledo, Cleveland, and Oil City, from which it is conveyed in pipes for 300 miles or more—*e.g.* to Philadelphia. The gas is so cheap and so clean that in the west of Pennsylvania and all over Ohio it is taking the place of coal as fuel; towns are lighted, factories worked, and even steel and glass made by it. With regard to this natural gas, the States has no rival; and, with regard to the oil, the only serious rivalry comes from the Caucasus wells round Baku and Batum.

A quarter of all the **oil** exported from the States—mainly from New York, but also from Philadelphia, Boston, and Baltimore—goes to Bremen and Hamburg to supplement the somewhat limited supplies from the valley of the Saale and other areas of lignite in Germany. The lignite itself, besides providing the raw material for the paraffin and petroleum industries, provides fuel for the numerous sugar refineries, *e.g.* at Brunswick, Magdeburg, and Halle; but, of course, it is not nearly so valuable as the true coal.

The latter is distributed through three areas in Germany—the basins of the Rhine, the Elbe, and the Oder.

The coal-fields in **the Rhine basin** lie along the

Ruhr, the Saar, and the Ill; and along the Saar and the Ruhr there is also abundance of good iron, similar in kind to that in the neighbouring Dutch possession of Luxemburg.

In **the Ruhr valley**, besides the famous "Krupp" town of Essen, there are a number of other towns, especially in Westphalia, engaged in iron and steel industries, *e.g.* Dortmund, Iserlohn, and Hagen; and the combined production of fuel and machinery has drawn to the neighbourhood, especially to towns on or near the Rhine itself, manufactures of all kinds, *e.g.* silk to Krefeld and Cologne, and cotton to Gladbach and Elberfeld-Barmen.

The other two parts of the Rhine basin are much less important commercially, partly because of their overwhelming political importance; but their supplies of coal and iron are, of course, very valuable to Metz and Strassburg. The only large commercial centre in the Saar Valley is Saarbrück; along the Ill there are Colmar and Mülhausen (*i.e.* the "Town of Mills.")

The **Elbe coal-fields** are situated in the Province and the Kingdom of Saxony. In the former they supply fuel and machinery to the great commercial centre of Magdeburg, a city as large as Rotterdam or Washington. In the latter, which is one of the most densely populated areas in Europe, the coal itself is mainly in the valley of the Mulde round Zwickau, while Chemnitz is famous for cottons and machinery, Leipzig for woollens and printing, and Meissen for "Dresden" china. Chemnitz, which is as large as Florence, is often called "the Saxon Manchester."

The only really large town in **the Oder coal-field** is Breslau, which is larger than Sheffield or Marseilles: but the whole of Silesia, like Saxony, is covered with

small industrial towns—" mere groups of factories and workmens' huts, surrounding a rock crowned by the proprietor's castle." The chief collieries are near Tarnovitz ; Görlitz is famous for iron and steel.

A glance at a political map will show that this Oder coal-field occupies a tongue of land which juts out south-eastwards between Russia and Austria ; and

MOSCOW.

the coal formation extends across the international boundary in each case. The Russian field lies round Warsaw, and the Austrian round Troppau and Brunn.

Both countries suffer, however, from the same defect —their coal is not found near any rich deposits of iron. The best Russian coal is found between Tula and Moscow in the centre of the country, and round Rostov

and Taganrog in the south ; and, though there is some iron in both districts, the best Russian iron is found in the Urals. So, while the best Austrian coal is round Pilsen, the best iron is at Gratz. The same is true of France : her richest deposits of iron are at Nancy ; while her coal is round Lille and Valenciennes in the north, and round Creuzot and St. Etienne in the centre of the country.

COTTON AND WOOL.

Clothing of some kind or other is an absolute necessity except amongst the most primitive peoples in the hottest parts of the earth's surface; and it is made of all sorts of materials. Even in the heart of the tropics, where clothing is not needed as a protection from cold, there is found an instinctive desire, even amongst the most savage people, to decorate some part of the body. And garments for one or other of these purposes have been manufactured from time immemorial, generally out of the fibres of plants or the skin and wool of animals.

The **Materials** vary with the climate. Thus, in countries like Siberia and Lapland, where the winters are intensely severe, both food and clothing are provided mainly by the animal kingdom; and the four great fur markets of the world—London, Leipzig, Nijni-Novgorod, and New York—get an enormous proportion of their supply from the far north. In the tropics, on the other hand, both food and clothing are provided mainly by the vegetable kingdom; while in temperate latitudes naturally a mixture of animal and vegetable products is required.

Of the **plants** used for clothing purposes, cotton

and flax are by far the most important; and, of the **animal** products, wool and silk. And the cotton and the wool are more important than all the other materials (used for clothing purposes) put together.

Cotton is probably a native of tropical Asia; and, certainly, two of the most important cotton products take their names from Asiatic towns—muslin from

LAPLANDERS.

Mosul, on the Tigris, and calico from Calicut. **Flax** is probably a native of southern Russia; and to-day Russia is the chief exporter of flax in the world, though the product comes—mainly *via* Riga—from the more northerly part of the country, where the soil has been fertilized for ages by the decayed leaf-fibre of the oak and beech forests.

Cotton grows best on light soils in warm climates; it is very sensitive to frost, and requires a considerable amount of moisture and of salt, the latter both in the soil and in the air. Consequently, it will grow best on low land near the sea in tropical and semi-tropical latitudes. When it is sown far inland, the absence of the saline influence of the coast causes the "wool" to be shorter in staple and less easily separated from the seeds; and, of course, plantations in hilly and upland districts require more moisture than those on low coastal plains.

The **three great cotton-producing countries** are the United States, India, and Egypt; but good cotton may be found in the market from Maranhão, Maceio, Bahia, and other ports, mainly in Brazil.

The cotton produced in **the States** is of two kinds, "sea-island" and "upland." The former is the finest in the world, and is used for the beautiful Swiss and French muslins. It is grown along the coast of Georgia, South Carolina, and Florida, and takes its name from the fact that it is largely grown on the numerous islands which fringe the coast. These islands are from time to time seriously damaged, and even altered in shape and size, by the storms which rise in the warm, damp, still air, so essentially suited to the growth of the young cotton plant. The chief ports of this district are Charleston and Savannah, the former of which is making very rapid progress; the chief inland centre is Augusta.

The "upland," or short staple, cotton compensates by quantity for what it lacks in quality. It is grown all over the low land in the south of the Mississippi basin, but specially in the States of Texas, Mississippi, and Alabama. The chief ports are New Orleans

COTTON PICKING.

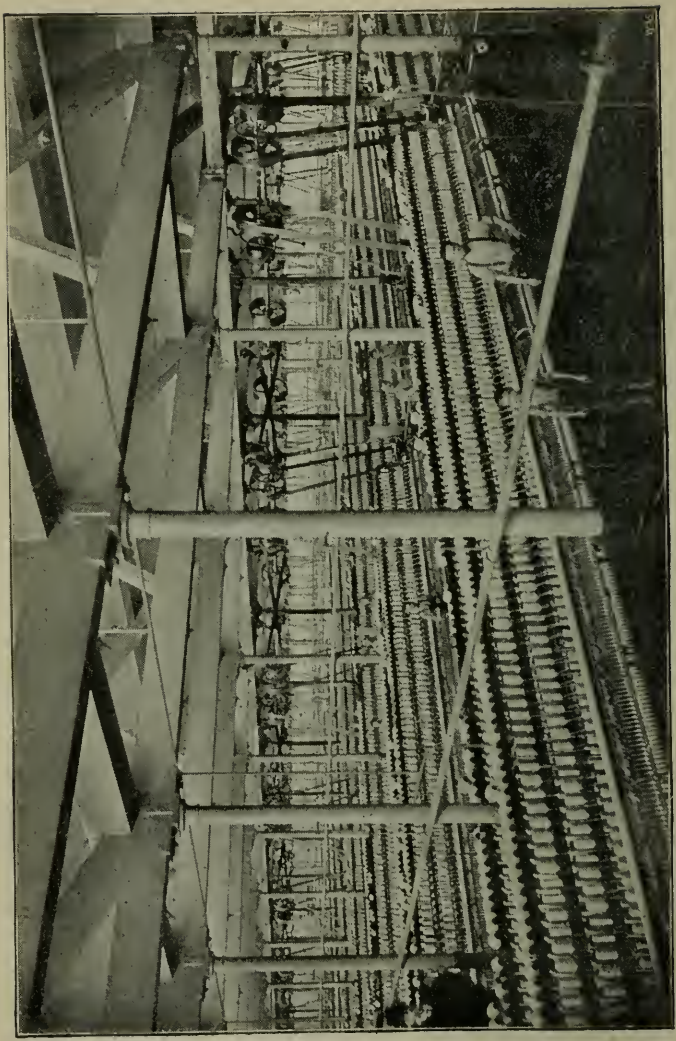
and Galveston; but Mobile and the river port of Vicksburg also do a large export trade.

Of the total crop about three-fifths are exported, mainly to Liverpool; and the home supply is shipped mainly to the **New England States**, especially Massachusetts. There the New York and Pennsylvanian coal is easily accessible from Lowell, Fall River, Lawrence, and New Bedford; but, just as far as proximity to the coal-fields is concerned, the cotton centres of Baltimore, Patterson, and Philadelphia, are more conveniently situated. The manufacture is also increasing in the south, especially in Georgia, where the supply of water-power is very great.

The **Indian cotton** is grown in the Ganges valley and on certain "black soil" lands of Bombay. The centres in the Ganges valley are the important railway and waterway junctions of Allahabad and Mirzapur; and the suitability of the Oude climate is largely due to the fact that the south-west monsoons off the Bay of Bengal are deflected by the southern spurs of the Himalayas so as to blow directly up the Ganges valley from the south-*east*. The Bengal industry is collapsing, however, owing partly to the persistent adulteration, and partly to the superiority of American and Egyptian cotton.

The **Bombay industry**, on the other hand, is flourishing. The soil, especially on the plains of Khandesh, North Berar, and Wardha, is a decomposition of volcanic rock, rich in lime; its tenacity in retaining moisture compensates for the comparative smallness of the rainfall to the east of the Ghats; the direction of the Tapti valley admits the south-west monsoons far inland; and the railway accommodation is excellent.

The finest cotton is grown in **Berar**, round Amraoti,



A MANCHESTER SPINNING-MILL.

Khamgaon, and Akola, all of which are on or directly connected with the main line from Bombay to Calcutta *via* Nagpur; and Surat, the town at the mouth of the Tapti, gave its name to Indian cotton in the British market.

Both the cultivation and the manufacture of cotton in India were greatly stimulated by the **Civil War in the United States.** During that war the stoppage of the American supply caused the British merchants to fall back on the Indian product; but, when the war had come to an end, the latter ceased to be in demand. Consequently, the Indian growers, with a large surplus left on their hands, began to manufacture it on the spot; and to this is largely due the almost unique commercial position of Bombay city. Ahmadabad, which stands on the low Gujarat plain, where coal is easily imported by the *Bombay and Baroda Railway*, also owes much of its importance to cotton.

This Bombay industry has greatly affected Lancashire, and has in its turn been affected by the rapid development of the cotton trade in Japan.

The **Japanese spinner** has a kind of advantage over his rivals in Manchester and Bombay in three respects. In the first place, his mills work much longer, *e.g.* an average of twenty-seven days a month at twenty-two-and-a-half hours a day. Then, he pays a very low rate of wage even to male operatives, *e.g.* fourpence to eightpence a day; and to women, who form three-quarters of the whole staff, he pays only twopence to fivepence halfpenny a day. Lastly, he has his market at his doors, the yarn being manufactured almost entirely for home consumption.

As far as **Manchester** alone is concerned, he has two further advantages: a portion of his raw material is

grown in the country, and his coinage is silver; but these advantages are counterbalanced by the fact that he has to pay a higher price for his coal, especially in Osaka, Nagoya, and Tokio.

As far as **Bombay** alone is concerned, he has the disadvantage of having to import at least half of his raw material, because Japanese cotton is too short in staple and too coarse to be suitable for spinning fine yarn; and the coarse yarns are too weak to be used

A LONDON AND NORTH-WESTERN TRAIN.

in power-loom weaving. Moreover, capital is comparatively scarce in Japan; and the average number of hands employed in the Japanese mills is not half that in the Bombay mills, which proportionately increases the working expenses.

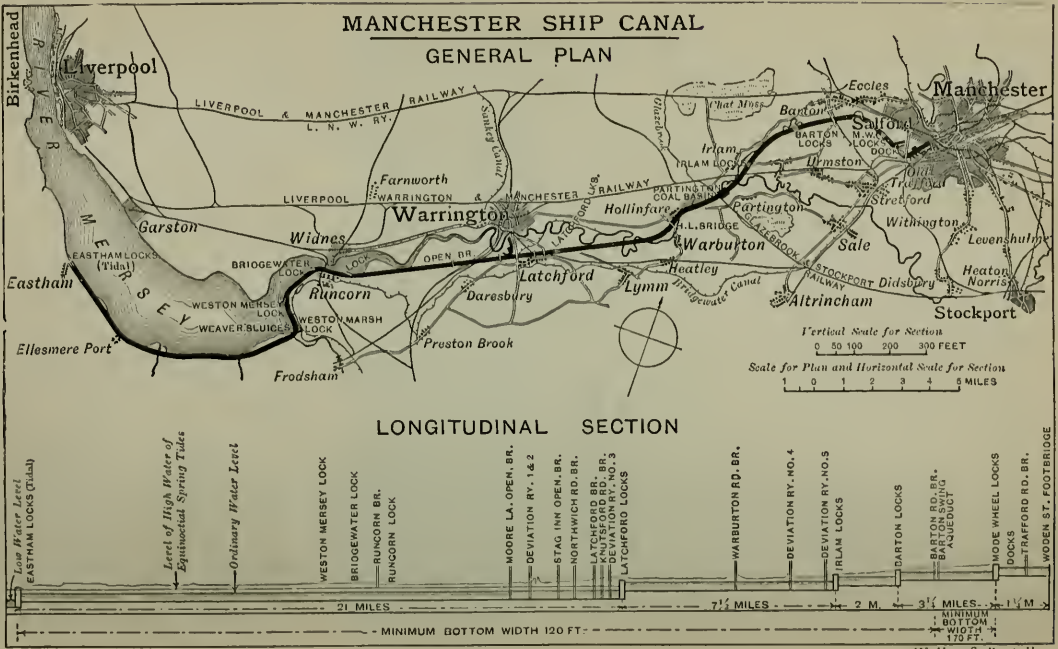
To the **Bombay cotton-merchant** it makes little difference whether he sells to an Indian or a Japanese spinner; and he has no fear of serious competition either from China or from Japan, for in China the soil and climate are not really suited to cotton, and

in Japan the land available for cultivation must be mainly devoted to the production of rice and other food-stuffs. But what does cause him anxiety is the new line of steamers from Kobé and Yokohama to Mexico, connecting *via* the Tehuantepec railway with the cotton States of the Union.

The **Egyptian cotton** is less in quantity, but much better in average quality, than the Indian. It is grown under peculiar conditions; for, though the "continental" air is very dry, the Nile supplies abundance of fertile mud and of water for irrigating. It is only in the Delta and Middle Egypt, however, *i.e.* from Alexandria to Siut, that the irrigation works are at present sufficiently scientific to guarantee a perennial supply.

By far the most important manufacturer of cotton in the whole world is **Great Britain**, and the seat of the trade is south-west Lancashire. Manchester is the centre of the whole industry; Oldham, Blackburn, and Bolton, are the chief spinning centres, closely followed by Accrington, Bury, and Rochdale; while Preston and Burnley do most of the weaving. Distribution of the goods by land is provided for by an excellent railway service: the *London and North-Western* main line from London to Glasgow runs through the coal-field from south to north, while the *Manchester, Sheffield, and Lincolnshire*, and the *Lancashire and Yorkshire*, run across the Pennine range from the Mersey to the Humber basin. The district is also served by the *Midland* railway, and by numerous canals.

Before the construction of the Manchester Ship Canal, **Liverpool** was the only port of the whole area; and, in connection with the enormous population behind it, it came to almost monopolize the American grain and cattle trades.


MANCHESTER SHIP CANAL
GENERAL PLAN
Birkenhead
Liverpool
MERSEY
LIVERPOOL & MANCHESTER RAILWAY
L. N. W. RY.
Sankey Canal
Chat Moss
Eccles
Manchester
Barton
Salford
BARTON LOCKS
M.S.C. LOCKS
DOCKS
Irlam
IRLAM LOCKS
Ormston
Old Trafford
Stretford
Farnworth
LIVERPOOL WARRINGTON & MANCHESTER RAILWAY
PARTINGTON COAL BASIN
Partington
Hollinfare
Warrington
Garston
Widnes
H.L. BRIDGE
Warburton
Sale
Withington
Levenshulme
EASTHAM LOCKS (Tidal)
BRIDGEWATER LOCK
OPEN BR.
Latchford
Heatley
Lymm
Irwell
Bridgewater Canal
Eastham
Runcorn
Daresbury
WESTON MERSEY LOCK
WESTON MARSH LOCK
WEAVER SLUICES
Altrincham
Didsbury
Heaton Norris
Stockport
Ellesmere Port
Preston Brook
Frodsham
Vertical Scale for Section
0 50 100 200 300 FEET
Scale for Plan and Horizontal Scale for Section
1 0 1 2 3 4 5 MILES
LONGITUDINAL SECTION
Low Water Level EASTHAM LOCKS (Tidal)
Level of High Water of Equinoctial Spring Tides
Ordinary Water Level
WESTON MERSEY LOCK
BRIDGEWATER LOCK
RUNCORN BR.
RUNCORN LOCK
MOORE LA. OPEN. BR.
DEVIATION RY. 1 & 2
STAG INN OPEN. BR.
NORTHWICH RD. BR.
LATCHFORD BR.
KNUTSFORD RD. BR.
DEVIATION RY. NO. 3
LATCHFORD LOCKS
WARBURTON RD. BR.
DEVIATION RY. NO. 4
DEVIATION RY. NO. 5
IRLAM LOCKS
DARTON LOCKS
BARTON RD. BR.
BARTON SWING AQUEDUCT
WOOD WHEEL LOCKS
DOCKS
TRAFFORD RD. BR.
WOODEN ST. FOOTBRIDGE
21 MILES
7½ MILES
2 M.
3¼ MILES.
1¼ M
MINIMUM BOTTOM WIDTH 120 FT.
MINIMUM BOTTOM WIDTH 170 FT.
Walker & Boutall sc.

What Manchester and Liverpool are to the cotton trade, Leeds and London are to **the wool trade.** London is the great wool market of the world; and a large proportion of the total import is re-exported, mainly to France, Germany, and the United States.

Of course, wool is obtained mainly from **sheep**; and sheep require a dry temperate climate tending rather to warmth than to cold. They need very little attention except at lambing and shearing time, and they thrive best on poor pastures, so long as the pasture area is extensive. This latter point makes it practically impossible for an "old" country to compete, as a wool-exporter, with a "new" one, where land is cheap.

Moreover, most **"old" countries** which raise wool in any quantity, need their product for home manufacture. Thus, Great Britain, France, Germany, and Russia, all raise wool, Russia in very large quantities; but all need it for local use, and have to import additional supplies. In the case of Germany, the peculiar excellence of the Saxon and Silesian wools causes them to be in great demand; and the same is true of some English wools, especially the long-staple wool of Lincolnshire and Leicestershire.

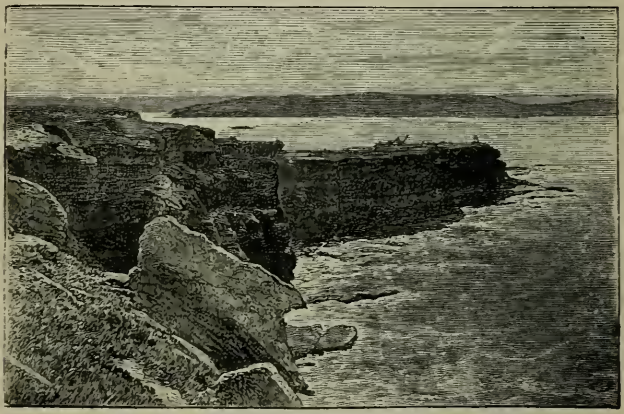
The **three chief wool-exporting regions** of the world are Australasia, the Plate basin, and South Africa. Of the three Australasia is by far the most important; and, amongst the Australasian colonies, New South Wales, New Zealand, and Victoria, practically monopolize the export trade.

So much has been said already about sheep-farming in **New Zealand** (p. 91), that we may confine our attention at present to New South Wales and Victoria.

Australia is a huge plateau, the edge of which is formed in most places by a low range of hills that rise

abruptly from the coast and break off abruptly on to the plateau. The effect of this on the rainfall is very bad, as it means that there is no condensing medium inland; and the dryness of the soil and the extreme heat help to waste even the small amount of rain which does fall, though some of it filters through into the natural underground reservoirs of the limestone formation.

New South Wales and Victoria, however, have advantages over the rest of the continent. The



ENTRANCE TO PORT JACKSON, N.S.W.

former contains the highest part of the mountain system, and fronts the warm water of the Pacific; and thus it practically monopolizes the main river system, *i.e.* the Murray, Darling, and Murrumbidgee. Between the rivers, where the rainfall is not sufficient for grass, and where irrigation cannot reach, there are vast plains covered with a semi-desert "salt-bush," which is said to surpass all other sheep foods in its wholesome and nourishing qualities. Moreover, these lands are ex-

tremely cheap; and, so long as the "runs" are lightly stocked for fear of drought, the absence of rain is an advantage to the wool. Thus, New South Wales has come to be the largest exporter of wool in the world, and the wool is called "Port Jackson."

The best Australasian wool, however, comes from **Victoria**, under the title of "Port Philip." For the quality of the pasture and the dryness of the air combine with the cooler latitude to produce a wool that is almost unrivalled for softness, lustre, and length of staple. The volcanic soil of the Ballarat district is specially favourable; and the marine character of the climate, at all events in the south, is proved by the fact that the wool can be spun and woven successfully at Geelong. Melbourne ranks scarcely behind Sydney as a harbour, though it is less conveniently situated for coaling purposes; but, in compensation for this, it has the better railway system.

At present **South Africa** is more important than the Plate region to Great Britain, though its total export of wool is really much less. Cape Colony, which is the chief exporter, is, like Australia, a great plateau, only, instead of sinking towards the interior of the country, it rises in terraces from a moist coast strip to dry flat-topped hills like *Table* Mountain. Here, again, the rainfall is deficient, because there are no regular winds blowing landwards; and, even if there were, those from the west could bring very little moisture off the cold Benguela current. Moreover, owing to the character of the surface and the climate, both filtration and evaporation are very rapid.

On the third terrace, however, there is a layer of clay, which not only contains the saline elements so useful in sheep-food, but also retains and economizes

the rainfall. This enables the soil to produce a most valuable semi-desert shrub, from the Hottentot name of which the terrace is called the Great *Karoo*; and on this shrub Angora goats and even Merino sheep thrive wonderfully. Consequently, wherever, as round **Graaf Reinet,** the land is not overstocked, and the pasture is not wantonly wasted by the flocks being always brought home to the same kraal by exactly

ROCHDALE CO-OPERATIVE—ORIGINAL BUILDING.

the same route, a large amount of wool and mohair is raised. It is shipped from Port-Elizabeth to London.

From London all the wool which is not re-exported, is sent by train to Leeds for distribution on the **West Yorkshire coal-field.** The woollen industry sprang up in that locality originally in connection with the Lincolnshire wool on the one hand and the numerous streams from the Pennine Range on the

other; and, when water-power was displaced by steam, the industry still remained there—on the coal-field. But the distance of the mines from the Humber, and afterwards the excellence of the *Midland* and the *Great Northern* railway services, caused the coal to be taken to London, and the wool to be brought back, by rail. Hull, Goole, and Grimsby, however, export a certain amount of the manufactured goods.

ROCHDALE CO-OPERATIVE—PRESENT BUILDING.

Leeds and Bradford are the centres of the industry; and there is a considerable division of labour among such towns as Halifax, Huddersfield, Dewsbury, and Batley. For instance, Halifax rivals Kidderminster and Wilton in the manufacture of carpets, and Welshpool and Rochdale in the manufacture of

blankets; while Bradford specializes in alpacas and mohairs.

With regard to the **Plate basin**, as with regard to New Zealand, the question of sheep-farming has been already discussed (p. 89); but two points may be noticed in special connection with the wool.

In the first place, although the south-east Trade winds bring enough hurricane-rain to the country to produce the required pasture, the climate—like that of Queensland, which has a similar rainfall—will be found too dry for the spinning of yarn. And, in the second place, very little Plate wool comes to London, most of it going to Havre, Dunkirk (for Roubaix), and Antwerp.

This is interesting in connection with the possible widespread **colonization of Argentina by Hebrews.** One of the most remarkable facts in the sociological history of the Hebrews is that—in spite of the unique advantages of Palestine as the meeting-place of the three great caravan routes of the Old World—it took ages to force them into commerce. Wherever the conditions of life allowed it, they took to farming, especially sheep-farming; even in their dispersion "Succoth" was still remembered as the most joyful of all the feasts; and only stern inhumanity drove them from the field to the counting-house.

Now, the **Plate trade** is essentially wool, animals, and grain, though the country contains the necessary supplies of coal and iron and of the precious metals. The conditions of life are, physically, perfect; the isotherm of Buenos Aires is 60° F.; the defence of the country is easy; the approach by sea is good. What is needed is security for commerce, including banking and insurance facilities, better communication

by steam and electricity with Europe, and colonists who combine industry and intelligence with the mercantile instinct.

The presence of the Hebrews there would probably divert a large amount of trade direct to London or Hamburg, and thus accentuate the **rivalry of Germany and Great Britain.** The Germans have no colonial instinct, which is the product only of years

THE POOL, LONDON.

of colonization; but they are our most formidable rivals in Europe, because they have a wide and sound knowledge of commercial geography, and because they work under such similar conditions. What Germany lacks in coast accommodation, she makes up by her rivers; and her physical features give her the same agricultural and manufacturing industries as we have. The Ruhr valley does the work of Clydesdale; Chemnitz is the Saxon "Manchester"; Aachen is

the "Leeds" of Rhenish Prussia; the Erz and Riesen gebirge represent the Mersey and Humber flanks of the Pennine Range.

Thus Germany carries on practically every trade that we do, with the addition of "home" trades in sugar, wine, and tobacco; and, as her only sea-coast is in the north, and her only open-sea harbours are in the north-west, her goods must seek markets in the same direction as ours do. The only points of distinct advantage to us geographically are that the Thames is much freer than the Elbe from ice, and has unique tidal conditions; and that the dry continental air of Germany is less suited than our humid insular air to spinning and weaving.

SOME IMPORTANT MARKETS.

THE majority of the great markets of the world are **harbours,** for merchandise must gravitate to the point from which it can be distributed most cheaply, *i.e.* by water ; and the general characteristics of a good harbour have already been described (p. 57). Moreover, what has been said above (p. 148) about Buenos Aires, may suggest some further points ; and these points may be illustrated at greater length by a consideration of some of the other South American harbours.

In physical aspect, **South America** somewhat resembles North America, for both have huge mountains, vast plains, and gigantic rivers. There is, however, one marked difference between the two—a difference of geographical position. The mass of the southern continent is within the tropics, while the mass of the northern is in temperate latitudes; and the effect of this upon South America is twofold. In the first place, the heat is very great ; and, in the second place, as the country extends on both sides of the equator, it receives rain from both the north-east and the south-east Trade winds. This causes its climate to be more 'marine" than that of any other continent.

ON THE AMAZON.

Moreover, as the Andes run down the west coast, while the wet winds blow—except in the south of Chile—from the east, the **great rivers** flow from the eastern slope of the mountains towards the Atlantic, *i.e.* towards the commercial nations of the Old World. And the existence of two mountainous plateaux, that

COLLECTING RUBBER.

of Guiana in the north and that of Brazil in the east, divides the river system into three great basins—the Orinoco, the Amazon, and the Plate.

Between these three mountain systems, and along these three rivers, there are **three plains**—the llanos of the Orinoco, the selvas of the Amazon, and the pampas

of the Plate ; and, corresponding more or less closely to these, there are three zones of vegetation—a sugar and cacao region in the north, a coffee and rubber region in the centre, and a grass and grain region in the South.

The latter, **the Plate basin**, being outside the tropics, is beyond the influence of the Trade winds ; and, therefore, it is much healthier than the other two regions, especially for Europeans and for sheep.

COFFEE PLANT.

Enough has already been said about it, however, for it is simply the area of Argentina, Paraguay, and Uruguay.

The coffee and rubber region of the centre is practically **Brazil**, the rubber coming from the low lands along the Amazon and the Madeira, while the coffee comes from the high lands of the east, especially from Rio de Janeiro and San Paulo. Nor are the reasons far to

seek. Rubber is the thick, milky sap of a tree which requires the precise conditions of soil and climate characteristic of the selvas ; and, consequently, the best rubber in the world comes from Para.

The needs of the **coffee** plant are different and more varied. The tree grows best at an elevation of from 3000 to 4000 feet above the sea ; and, as it is grown so largely for export, the best situation for a coffee plantation is a low mountain range near a coast which possesses good harbours. But, as the plant requires also great heat and a considerable amount of moisture, and as the soil ought to be rich in decayed vegetation, the best sites will be further limited to a forest-clad range in the tropics and exposed to the Trade winds.

All these qualifications are possessed by the seaward slopes of the Serra do Mar ; and, therefore, **Rio de Janeiro** and Santos are the two greatest coffee markets in the world. Indeed, coffee has made Rio the most important city except Buenos Aires in the whole of South America ; and, in the matter of its harbour alone, it is superior to Buenos Aires.

The third area of the continent to which we have referred, is the **cacao and sugar** area ; and, in several respects, the two plants are very similar. Both grow best on alluvial deposits of volcanic soil, such as are brought down from the Andes by the Orinoco and Magdalena ; both require great heat and moisture, such as are characteristic of Colombia, Venezuela, and the Guianas ; and both demand low elevations, such as are found on river and coastal plains.

There are, however, **several differences** between the two. The cacao tree, like the coffee, having a long tap root, requires a deeper soil than the sugar-cane ; it cannot bear even intermittent sea-breezes, which are

extremely beneficial to the sugar; and it can flourish in the absence of lime, which the sugar cannot. Consequently, while the best cacao is grown on the sheltered plain of the Orinoco, the best sugar is grown on the coastal plain of the Demerara; and, while the great cacao market of La Guayra, the port of Caracas, lies under the shelter of the Silla Mountains, the sugar

CACAO PLANT.

markets of Georgetown and Paramaribo are exposed directly to the N.E. Trade winds.

In the nature of things, however, sugar, unlike cacao, is a crop eminently suited to an island; and the greatest producers of cane-sugar in the world are the **East and West Indies**. The competition of beet-sugar, especially from Germany and France, the laziness of the emancipated negroes, and the unscientific culture,

have greatly depreciated the cane industry in the West Indies; but Cuba, Jamaica, Trinidad, and Barbados, still produce large quantities of sugar, as well as molasses and rum. Indeed, Cuba produces twice as much cane-sugar as any other country in the world, Java coming second; but, while the Batavia export is almost entirely to Great Britain, that of Havana is almost entirely to the United States. Havana, as its name implies, is a splendid "haven."

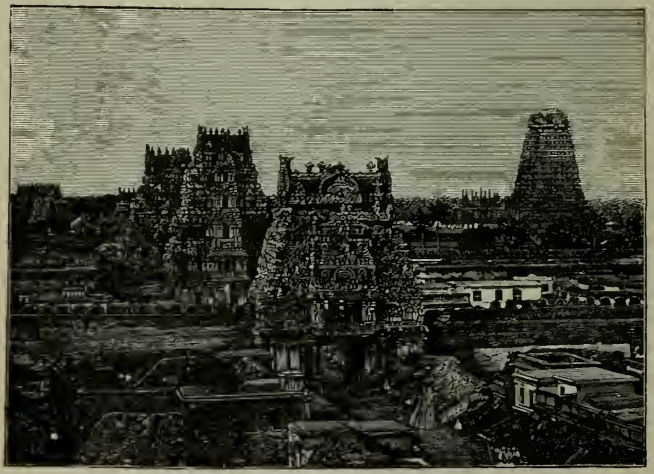
The characteristic product of Cuba is, however, **tobacco**; and the best quality in the world—at least, for cigars—is grown west of Havana. There, in the celebrated Vuelta-abajo district, the soil is a light, sandy loam, very rich in lime, potash, and forest refuse; and, as both the heat and the humidity are great, it is an ideal site for the tobacco plant.

As the area is strictly limited, it is physically impossible for half the "**Havana**" cigars which are in the European market to have been grown in this district. So, too, gallons of wine are distilled into "Cognac" which never came from Charente; millions of oranges are labelled "Jaffa" and "St. Michael" which never grew in Palestine or the Azores; tons of "Patna" rice hail from Bangkok or Rangoon; and hundreds of "Kashmir" shawls are woven in Paisley, though some do still come from Srinagar.

At present the only important rival of Havana in the production of cigars is Manilla; but, in regard to the total quantity of tobacco grown, the **United States** rival Cuba and the Phillipine Islands combined, and British India is not very far behind the States. While the Indian tobacco is, however, of inferior quality and largely converted into Trichinopoli cheroots, the Virginian and Kentucky product is of excellent quality

and largely converted into pipe and cigarette tobacco. Louisville, the Kentucky centre, though not so well known as Richmond, the Virginia centre, is the largest tobacco market in the world.

One reason why Indian tobacco is not very good, is that the plant is not a characteristic product of the country, such as, *e.g.* **tea** is. The latter is a native of Assam; therefore, it ought to grow better in the Brahmaputra valley than anywhere else in



THE SRIRINGHAM PAGODA, TRICHINOPOLI.

the world. Indeed, it must originally have been taken from there into China; but the variety grown in China now differs somewhat from that grown in Assam.

The main difference is illustrated by the **different heights** at which the gardens are situated. In China, as along the Himalayas, they are at a height of several thousand feet; and, in the case of India, this

is a great attraction to European planters. The best known Himalayan gardens are in the Punjab and Bengal, round such famous "summer-stations" as Palumpore, Simla, and Darjiling.

In all these places **the soil and the climate** are alike suited to the plant. For instance, the rainfall is heavy and regular, but the slope prevents the moisture from settling round the roots of the plant; the soil is light and friable, but plentifully supplied with vegetable

TEA PLANT.

refuse from the Himalayan forests: the heat is great, and there is abundance of iron in the formation.

The main drawback is that the climate tends to extremes, and the weather is apt to be stormy; and, therefore, the seed-beds require to be protected by a hedge of some kind of quick-growing tree. This is generally supplied by the **cinchona**, which is valuable also for its "Peruvian bark."

This protection is quite unnecessary in the natural hot-bed of the sheltered Brahmaputra valley, where

there is also the additional advantage of **teak** forests; for teak, or some other wood which contains no resin or aromatic oil, must be used for the tea-chests. For a similar reason, fresh grapes must be exported, *e.g.* from Cape Town, in cork-dust, which has neither taste nor smell, and which has the additional advantages of being very light and of absorbing the moisture of any broken grapes.

The chief centres along the Brahmaputra itself are at Dibrugarh and Sibsagar; but the valley of the Barak, *i.e.* practically **Cachar,** is rapidly becoming more important. There are some gardens near Sylhet, but the great centre is Silchar; and a railway is being constructed from Chittagong to serve the whole tea area. Chittagong itself, though a river port, is one of the very best of the smaller Indian harbours.

The best **Chinese gardens** are situated along the Ta-yu-shan or Bohea mountains, especially in the provinces of Kwang-tung and Fo-kien, to which the necessary moisture is brought by south-east monsoons in summer; and the product naturally gravitates for export to the various harbours between the mouths of the Yang-tsi-kiang and the Si-kiang. The southern harbours of Swatow and Amoy are more important than the northern ones of Hangchow and Ningpo; but the real centre of the whole coastal trade, especially for "black" tea, is Fu-chow. At the same time, Hankow, which is accessible by ocean steamers, is a very important market for the interior of the country; and Canton still retains, in connection with Hong-kong, some of the trade which it acquired in the old days when it was the only Treaty Port.

Canton is more interested now, however, in the **Silk** trade. For the silk-worm is a native of the

land of the pagoda and the pigtail, and Southern China produces as much raw silk as all the rest of the world combined. The best mulberry groves are in the provinces of Chekiang and Kwang-si; and, therefore, Shanghai shares with Canton in the export of silk.

Their chief rivals in this trade are Osaka and the double port of Kobé-Hiogo, and the reason is obvious. For the position **of Japan** with regard to America enables it to anticipate China in the United States markets with its two staples of tea and silk. The

LOCOMOTION IN HONG-KONG.

importance of the silk trade may be gauged from the fact that the Japanese speak of the silk-worm by the dignified, but disproportionate, periphrasis of "The Honourable Mr. Baby." And the success of the tea-gardens is largely due to the Kuro Siwo, which does for the Japanese islands what the Gulf Stream does for the Bermudas, making the climate moister and milder than would be expected from the latitude. Kioto, the old capital, is the centre both of the tea-gardens and of the mulberry groves; and it is connected by rail with the neighbouring ports of Osaka and Kobé and with Yokohama.

France is the great consumer of raw silk, Marseilles

importing enormous quantities for distribution to Lyons and St. Etienne; and her only serious rival is **Italy.** The latter, however, also produces a large quantity of raw silk—in Lombardy, Venice, and Piedmont; and the silk factories of Basle and of Alsace and Baden have direct access to the Italian market of Bergamo *via* Milan and the St. Gothard Tunnel.

ST. GOTHARD TUNNEL.

Lyons specializes in silks and velvets, and St. Etienne in ribbons; and both have rivals. The silks of Milan and Krefeld, and the velvets of Genoa, are very little, if at all, inferior to those of Lyons; while the ribbons of Elberfeld-Barmen and Coventry compete with those of St. Etienne in quality, if not in quantity.

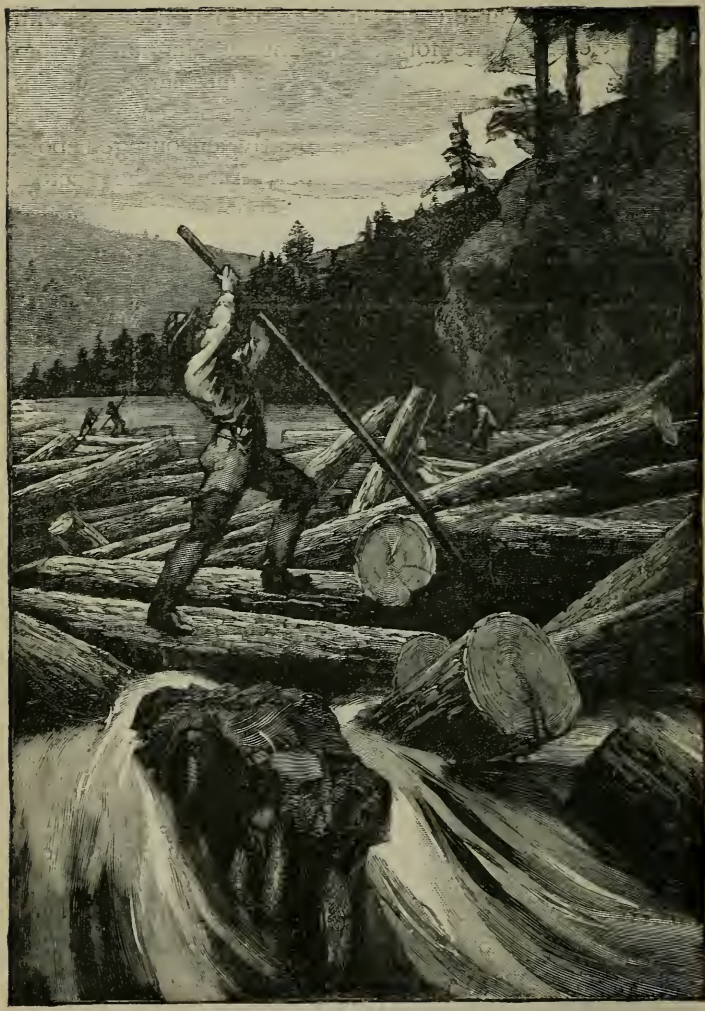
There is also a rising silk industry in India, divided between Bombay and **Murshidabad.** The latter, which

is about the size of Oldham or Sunderland, stands on the Ganges near the coal-field of Raniganj and within easy access of the forests of Chutia Nagpur. From these forests, as from those of Kashmir, large supplies of Tasar silk are obtained; and the presence of coal and a navigable river have greatly encouraged both the cultivation of the mulberry and the actual manufacture of the silk on the spot.

This is one of the points in which India does not contradict the general rule that **forests** in tropical and semi-tropical latitudes produce luxuries rather than necessaries. For instance, almost all the ornamental woods, except walnut and maple, come from hot climates. Thus, mahogany comes from Hayti and Honduras, ebony from East Africa, rosewood from Brazil, and so on. On the other hand, the teak of India and Burmah, the pencil-cedar of Florida, the kauri pine of New Zealand, the eucalyptus of New South Wales, and the jarrah of West Australia, are extremely useful. Indeed, teak is the most useful timber in the world for shipbuilding purposes.

The ordinary **timber of commerce**, however, comes mainly from North America, Russia, and Scandinavia; and, of all the timber-exporting areas, Russia and Canada are the most important.

Below the Tundras of Northern **Russia** there is a broad belt of pine, in the damp clearings of which oats and rye are grown; and below this belt there is another, composed of oak and beech, the clearings of which have been so richly manured for centuries by the fibre mould of fallen leaves that they raise enormous crops of such fibres as flax and hemp. Archangel is the port of the evergreen belt, and Riga of the deciduous belt; and much of the flax



LOGS.

and hemp from Riga, especially the flax, is attracted to the great linen centres of Dundee and Dunfermline.

Canada owes most of her present prosperity to the forests of her eastern area, for the "lumberers" were the best possible pioneers; they made roads, bridged the rivers, and cleared the land of "lumber"—for the farmers who were to follow them.

The suitability of Eastern Canada for timber is due to its position between three large areas of **water**—the Great Lakes, Hudson Bay, and the Gulf St. Lawrence—from which there is very great evaporation. There is, however, practically no good condensing medium for rain; and, therefore, most of the moisture evaporated is precipitated, by the cold winds from the north, in the form of snow.

This is an immense advantage to the timber trade, for the **snow** can be beaten into excellent temporary roads; and, of course, in the unsettled parts of the country, where the supply of timber is greatest, there are no other roads or means of transport at all. Nor is this all; for, when the snow melts in the spring, the resulting floods carry the "logs" down to the saw-mills.

The chief timber provinces are Ontario, Quebec, New Brunswick, and British Columbia; and the timber is mainly of **four kinds**. Where the surface is so flat, and the precipitation so heavy, that marshes are prevalent, *e.g.* along the Restigouche river, cedar flourishes best; and the conditions under which it is grown make the wood very suitable for fences, railway "sleepers," and other purposes involving constant exposure to weather. Another valuable tree is the hemlock spruce, the bark of which is very useful

DOUGLAS FIR.

for tanning; and the combination of hemlock forests and pasture round Quebec and Fredericton has given rise to a large leather industry in both these towns.

The pine and the maple are, however, the most valuable of all Canadian trees. The former is strong, light, and easy to work; the latter gives a large amount of sugar in March, has a very beautiful wood, and makes excellent fuel, even when apparently quite drained of its sugar. Ottawa, which is practically in the middle of forests of white and red pine, is the centre of the whole timber trade of the Dominion; and it derives its mechanical power from the famous Chaudière Falls.

The **British Columbian** forests cover the west, *i.e.* the wet, side of the Cascade Mountains; and, owing to the influence of the Kuro Siwo and the south-west Anti-Trade winds, the range of temperature is comparatively so small that some of the trees, *e.g.* the Douglas fir, grow to an enormous height—and that, without growing too fast to have a good grain.

Of course, this abundance of timber is extremely useful to the miners at Hope and other towns along the Fraser and the Columbia rivers, and contributes materially to the trade of New Westminster and Vancouver.

In the United States the **Cordilleran** formation of the Rocky Mountains contains even more valuable deposits of the precious metals; but it is very badly supplied with rain and with timber. Indeed, some of the richest deposits—*e.g.* those at Comstock, Eureka, and Leadville—are in districts that are practically rainless and treeless.

In this connection it is worthy of notice that in the same latitudes we find **desert** regions all over the

world, both north and south of the equator. North of the equator there are those of the Sahara, Arabia, Persia, India, and Tibet, and south of the equator those of Australia, Chili, and the Kalahari.

The reason for this is that there are no regular winds blowing *towards* the two Tropics. On the contrary, all the **regular winds** start at the Tropics, and blow either towards the equator or towards the nearer pole. Consequently, these two chains of deserts correspond to the two belts of calms—those of Cancer and Capricorn. The third belt of calms—*i.e.* the equatorial—is a belt of constant rains, owing to the enormous evaporation ; and it is along this belt that we find the great tropical forests of the Amazon and the Congo basins.

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